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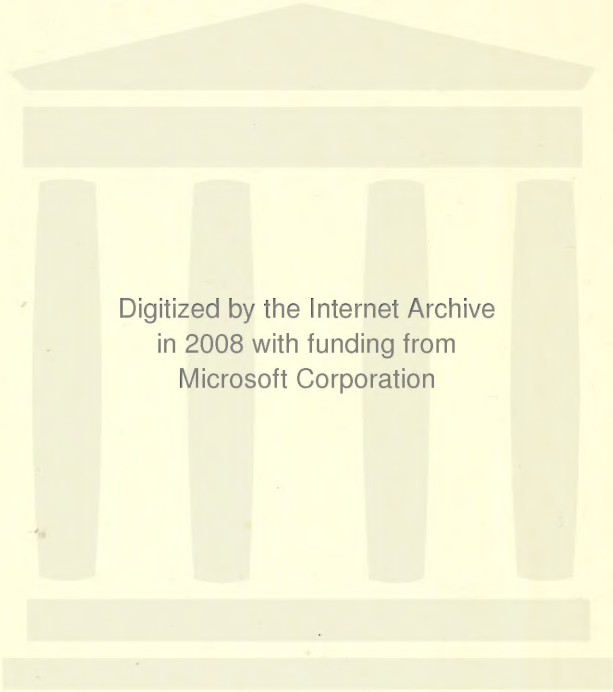

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THE SCOTTISH GEOGRAPHICAL MAGAZINE

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Branches of the Society have been established in Glasgow, Dundee, and Aberdeen, where periodical Meetings are held.

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THE SCOTTISH GEOGRAPHICAL MAGAZINE.

GEOGRAPHY AND THE COURSE OF THE WAR.[1]

By Geo. G. Chisholm, M.A., B.Sc.

I begin with a remark which, I hope, is superfluous. It is my purpose to confine myself strictly to my subject. I intend to enter upon no denunciations: I do not propose to dwell upon any national moral ideals in connection with the war. But I would not have it supposed that if I do not take notice of such matters it is because I do not recognise the existence of national moral ideals and their influence upon the war, but I simply pass them over because they do not belong to my subject. The only way in which I shall have occasion to refer to moral influences in connection with the war will be in so far as geographical factors can be recognised as affecting national judgment of right and wrong.

It may be well also to emphasise again, even at the cost of repeating myself perhaps a little too often, one or two facts as to geographical influences. In the first place, we must never forget that for the most part we are without the means of measuring geographical influences. The best we can do is to make it pretty clear that such and such influences have been at work more or less powerfully, even although we may not be able to say they are decisive factors. Secondly, it must always be borne in mind, and there will be occasion in this lecture again to point out by way of illustration, that geographical influences vary with the circumstances of the time, and lastly, we must never forget that geographical influences, where human activities are concerned, must never be conceived as acting of themselves, infallibly bringing about certain results. The operation of those influences must always depend to a large extent upon the degree in which men have the insight and the resolution to turn geographical conditions to account.

[1] A Lecture delivered at the annual meeting of the Association of Scottish Teachers of Geography, on the 19th of November 1915.

With these preliminary observations, I now enter upon my subject, but in doing so I feel compelled to go far back in history. One of the facts that must have struck every one, as borne out in a marked degree by the course of this war, is the remarkable strength, more particularly of Germany as a nation equipped for war, at least by land, in every respect. For that I believe there is a geographical explanation in the sense in which I have shown that geographical explanation can be looked for, but it is to arrive at that geographical explanation that we must take a wide sweep over past history. I go back to the time, considerably more than a thousand years ago, when, at the partition of Verdun, the claim to the succession of the ancient Roman Empire in the West fell to the eastern portion of the empire of Charlemagne, which was then divided. That led the so-called Roman Emperors, or Holy Roman Emperors, to make frequent attempts to become masters of the much richer and much more civilised country to the south of the Alps, which naturally they claimed as belonging to the Empire, and which was so much more attractive than the vast extent of forests and swamps which then formed the dominion upon the northern side of the Alps. Repeated wasteful expeditions across the Alps were made in order to enforce that claim well into the thirteenth century, and even subsequently. But the result of that was that in what we recognise as Germany, in the lands occupied by German-speaking peoples, the power of the emperors became less and less. Germany in reality came to be broken up into a great number of petty dominions, some with ecclesiastical and some with lay overlords and princes with various titles, a large number of them, what were known as imperial free cities, owning allegiance, to a large extent merely nominal, to the Emperor, but in fact regulating their affairs as little independent republics. The weakness resulting from this subdivision is obvious. It was such that at one time, when the power of the Emperor proved absolutely inadequate for providing even the necessary protection for commerce, that protection had to be afforded by a voluntary union of German cities, chiefly in the northern plains, many of these cities being imperial free cities of the kind already described, but others reckoned as part of the dominion of minor German states. It may be looked upon as one of the results of this disunited condition of Germany that when the Reformation began in that region it proved a further disintegrating force. In other countries, no doubt, the Reformation brought about violent conflicts, but in the end, for the most part, one section or the other remained distinctly predominant. Germany, on the other hand, remained divided among states of greater or less size, some of which had accepted the Reformation while others adhered to the Catholic faith. That was the situation at the commencement of the disastrous Thirty Years' War (1618-48), during which Germany was again and again overrun by foreign invaders, Swedes, French, and others, and the results of which remained in a still further weakened Germany down to comparatively recent times. "When Germans tell us," says Sir Grant Duff, "as they often do, that their country is only just recovering from the ravages of the Thirty Years' War, we are at first tempted to smile; but if we

examine into the matter closely, we shall find that their statement is literally and perfectly correct."[1]

The extent of the political disunion even in the eighteenth century down to about the time of the Napoleonic wars is clearly shown in any historical map of that epoch, as, for example, in sheet 47 of Andree's *Historischer Handatlas*, showing a considerable number of small states even in the north German plain, and, it may be observed, a kingdom of Prussia wholly outside of the German empire. It is obvious that this state of disunion greatly facilitated the Napoleonic conquests and aggressions of the early part of last century. But now I come to the point when all this past history began to have the effect of building up the strong Germany which we have at the present day. It was the humiliations of the early part of the Napoleonic period that at last brought about such a profound reaction as in the end led to the existence of a united Germany, in a large measure homogeneous in language. The aspirations of that period, as everybody knows, are expressed in the well-known song of Arndt's—

> "Where'er the German tongue is heard
> That is the German's Fatherland."

It is true that the German Empire is not quite so extensive; true, also, that it embraces a great deal of territory which is not German in speech. But the great bulk of the population is undoubtedly frankly German in feeling as well as in language, and it is a Germany so deeply conscious of the humiliations resulting from its past disunion, so conscious of the dangers to which it is exposed both upon the east and the west, that it has since been resolute in its determination never to be subjected to such humiliations again, and ready therefore to accord to the central authority the powers necessary to organise war in the most efficient way for defence, and especially military as distinct from naval defence. It has long lived in dread of a war on two frontiers. The ancient hostility between the Teutonic Central Europe and the Slavonic east is sufficiently indicated by the fact that the wars between Teuton and Slav have given to many languages the word for slave, originally meaning a captive of Slavonic speech, but proved by documentary evidence to have been already used in its present sense as far back as the ninth century. And the danger of war on that side has been all the greater since the swallowing up of Poland, which might have served as a buffer state. As for France on the west, it was to that nation that Germany owed some of the bitterest humiliations that it remembers in the past, and unfortunately perhaps for Germany, that antagonism was made only worse by the annexation of French territory at the close of the Franco-German war (1870-71). If the dread of a war on two frontiers is largely a matter of ancient history that was made only worse when the attempt

[1] He adds: "Those who would realise what the Thirty Years' War really was, and who cannot turn to M. Freytag's *Sketches*, may look at a useful little book, *Gustavus Adolphus*, partly founded on them, by the Archbishop of Dublin, which will explain to them very clearly how the effects of that great struggle have been so lasting."—Sir Grant Duff's *Studies in European Politics*, chap. iv. p. 248.

made by Bismarck to bring about a permanent alliance between Germany, Austria and Russia, the celebrated Three Emperors' League, in the end proved abortive. The alliance remained in force down to 1887, but came to an end when Alexander III. of Russia refused in that year to renew the agreement of Skiernewice, and the situation was made still worse from the German point of view when, ten years later, on the occasion of the visit of President Faure to St. Petersburg (as it then was called) the alliance between Russia and France was openly recognised. From that time Germany understood that if ever it became involved in a war with either of these two powers it became at the same time involved in a war with the other. The alliance with Austria still remained, however. Though that state was excluded from the German Empire on account of the large amount of non-German lumber [1] attached to it, it was obviously useful to Germany as an ally, just as Germany was manifestly useful to Austria, especially since Russia had withdrawn from the alliance. The two powers together have uninterrupted communication from sea to sea through Central Europe, with the hope of more extended communication of a like nature towards the south-east, though this latter prospect brought them into conflict with the ambitions of Russia.

The fact that a war on either frontier must prove a war on both determined the nature of the plan of campaign on the part of Germany when war actually broke out at the end of July last year. It was, as you all know, the purpose of Germany merely to have a sufficient force upon the eastern frontier to contend with the comparatively small armies which it was anticipated was all that Russia in the first instance, owing to the deficiency of its means of internal communication, would be able to bring against her, and to throw an overwhelming force upon France, so as to crush that power in sufficient time to have equally overwhelming forces ready to meet the growing armies of Russia in the east.

We must now look into the geographical conditions that influenced the manner of that attack upon France. The German frontier on the side of France is one of remarkable natural strength. It is largely formed by the Vosges mountains, which are still a serious obstacle to communication, having no line of railway passing through them. To the south there is an easy but narrow opening between the Vosges and the Swiss Jura ; to the north of the Vosges the country to be crossed, that through which both railway and canal pass into Alsace from the northern part of the Seine basin, though easier than the Vosges itself, is nevertheless rough and difficult. Further north lie the Grand Duchy of Luxemburg and the kingdom of Belgium. Upon the situation of Belgium from a military point of view there are some remarks made by Professor Partsch in his chapter upon the "Geographical Conditions of National Defence" in his work upon Central Europe, which are of peculiar interest at the present juncture. His words are these :—

"In opposition to the French efforts at expansion, which at one time succeeded in setting back this frontier as far as the Baltic, the European

[1] This expression is of course used from the German point of view.

Powers took measures at the Congress of Vienna, in 1815, to protect Germany, which, owing to its divisions, was at that time weaker than it is now. Switzerland and the kingdom of the United Netherlands were created buffer states. The neutrality secured to these was also promised in 1832 to the newly formed kingdom of Belgium. The value of this protection on both flanks of the western frontier of Germany does not depend solely upon the security of international agreement and the doubtful readiness of the guarantors to protect this neutrality by force of arms. The neutral states themselves have shown, by the measures of self-defence which they have undertaken, that they are not disposed to let themselves be involved without resistance in the quarrels of their neighbours. It remains, however, somewhat uncertain whether they would have resolution enough to throw their defensive power quickly and emphatically into the balance against the invader of their neutrality.

"This is all the more doubtful, because the temptation not to respect neutral territory only arises when a strong militant power has already obtained considerable advantages and its superiority begins to be decisive. As long as both adversaries face each other in the fulness of their power, neither could venture, unpunished, to turn the flank of the other by crossing a narrow strip of neighbouring neutral country. But when the strength of the two parties begins to be unequal, the stronger may attempt by thus reaching across to hasten the final decision, and to protect itself against reverses. In any case, it is obvious that Germany could never have anything to gain by taking this course. Aix-la-Chapelle lies 264 miles distant from Paris, and Metz 200 miles, and the way through the fortresses of the Sambre to Paris is not easier for a German attacking army than that by way of Verdun. Nor could a march through Switzerland give any greater advantage to German troops."[1]

One feels a strong sense of irony in reading these remarks at the present time. Yet I have not the slightest doubt that these observations were made by Professor Partsch in perfectly good faith. I have the honour of knowing Professor Partsch. He is a man whom I hold in the very highest regard, and my knowledge of him makes my assurance in holding the view which I have just expressed quite firm. Moreover, we must remember that during the Franco-German War the neutrality of Belgium, and even of the Grand Duchy of Luxemburg, was strictly respected. But even if Professor Partsch was perfectly honest in making the statements I have above quoted, it does not follow that the same views were entertained by the German Government, and at any rate we cannot forget the vital difference in the situation in 1914 as compared with that which existed in 1870. In 1870 Germany had no reason to fear that she would be attacked in the rear while she was engaged with France upon the west. It was the certainty that Germany was to be engaged upon the east as well as the west frontier which made her feel that it was a matter of such vital interest to her to take what she believed would be the quickest way to the heart of France, even at the sacrifice

[1] Professor J. Partsch's *Central Europe*, chap. xx. pp. 326-7.

of engagements to which she acknowledged herself to be committed, and which, we are told, were originally made in her own interest.

What is somewhat astonishing in connection with this movement upon her part is the fact that the German Government should have been so excessively surprised that that action of hers should have brought this country in as one of her antagonists. Utterly surprised the German Government undoubtedly was. That surprise was clearly based upon the fixed idea of the extent of the pacific feeling in the United Kingdom. Germany seems to have been convinced that the great mass of the people in this country were filled with the idea ascribed to the late Lord Salisbury "that the greatest interest of England is peace." True. I quite believe that the greatest of British interests was peace. But equally do I believe that the greatest of German interests was peace. But not peace at any price. There are few people capable of thought (it would, perhaps, be an exaggeration to say that there are none) who would think peace desirable absolutely at any price, and I have no doubt whatever that the German Government recognised perfectly well that it was not really the interest of this country to accept peace on the condition of seeing the neutrality of Belgium violated. To have allowed the violation of the neutrality of a country whose independence was expressly guaranteed by ourselves, as well as by Germany, and which carried on the government of its country in such a manner as to do no kind of injury to its neighbours, least of all to Germany, would have been on the part of this nation to sign her own death warrant. That Germany well knew, and yet that knowledge did not prevent her from grossly exaggerating the pacific feeling in this country. How well the geographical situation was recognised in Germany is shown by a remark made by a German professor of large vision in a paper written during the war, wherein it is stated that "England is bound morally as well as by her own interests to drive Germany from Belgium."[1]

The violation of the neutrality of Belgium suggests the question whether Germany had not a strong interest in violating the neutrality of one or two other countries, more particularly Holland and Denmark. That the possession of Belgium would be of advantage to Germany is unquestionable, but there is hardly the slightest doubt that the possession of Holland by Germany would be of even greater advantage to her. Belgium, I have already remarked, governed her country in such a manner as to do no injury to Germany; the same can hardly be said of Holland. That country owns the lower part of the river Rhine, whose navigation is of such transcendent importance for the most valuable industrial region of Germany. It would be of great advantage for Germany to have the lower part of the Rhine deepened, and to have Rotterdam made into a still greater port than it is. But Holland persistently sets her face against deepening her portion of the Rhine, perceiving that the result of that would be that larger ships would ascend right up to Cologne to the prejudice of her own port of Rotterdam. No

[1] Moritz J. Bonn, Professor of Political Economy, University of Munich, in a paper on "Commercial Isolation *versus* International Trade," in the *Annals of the American Academy of Political and Social Science*, vol. lxi., September 1915, p. 65.

doubt it is to her own advantage to have the accommodation and equipment of the port of Rotterdam, and the access to that port, made as excellent as possible, but it is probably beyond her resources to make such a port as in all probability Germany would create there, if Holland came within the power of the larger country. Nevertheless during the present war I have never been in any dread of the neutrality of Holland being violated, for that would simply have the result of enabling this country more easily and completely to close the commerce between Germany and the outside world by way of the Rhine.

Then as to Denmark. It surely must be very obvious that the control of all the avenues between the Baltic and the North Sea, between the Danish islands and the mainland, would be of the utmost importance to Germany during this war, if she could get that control. That has been clearly enough shown by the way in which some of our submarines have lately been able to slip through into the Baltic and interfere so seriously with the commerce of Germany in that sea, besides doing damage to the German naval forces. Yet I have no fear of the neutrality of Denmark being violated. For so long as this country maintains the command of the sea as it does, to attack Denmark would simply mean to throw that country into the hands of the Allies, and so have the effect of closing the Baltic to Germany instead of enabling Germany more completely to close the Baltic to us.

To come now to the results of the action which has led to these digressions, I need spend very little time in speaking about the course of the war on the western frontier. That I know you all have followed with sufficient detail to make very little comment necessary. You all know of the great success which attended the first onset of Germany after the fall of Liège, the rapidity with which her armies overran nearly the whole of Belgium, and eventually France to the neighbourhood of Paris, the way in which, however, it was then surprised by finding the army awaiting her upon her right flank which compelled a hasty retreat back across the Marne and the Aisne, and the way in which gradually a continuous line of trench warfare was established from the Swiss frontier to the sea. It is hardly even necessary to dwell on the importance of rivers as means of defence in these operations. That was again and again illustrated by the fierce battles at river crossings, fiercest of all, perhaps, on the banks of the Yser, where there is not merely the obstacle presented by the river itself, but also that offered by the low banks, liable to flooding upon both sides.

But here I want to call attention to another geographical fact of importance. It is the practice with a good many who are greatly impressed with the extraordinary success of German achievement within the last forty years or so to belittle the natural resources of Germany. That certainly is a great mistake. To begin with, Germany has agricultural resources enabling it to endure isolation from the greater part of the rest of the world at any rate for a very long period. It has excellent natural means of communication, including what is probably the most useful navigable river in the world. It has great mineral resources, including by far the most important coalfield on the mainland of Europe,

other valuable coalfields elsewhere, besides valuable deposits of iron ore, including the one that is still the most productive in all Europe. The working of this last deposit furnishes a manure rich in phosphorus, and it has the only very important natural deposits of potash in the world. Further, we have now to note that the early conquest of the north-east of France put it in possession, and it has since remained in possession, of the most valuable deposits of iron ore in Central Europe outside of her own frontier, those lying in the extreme north-east of France round Briey, deposits which within the last few years have been increasing their production at an even more rapid rate than the neighbouring deposits of German Lorraine. Throughout the war also Germany together with Austria have had in their possession not only the great coalfield (with zinc deposits) in the south-east of Silesia, but also the continuation of that coalfield across the frontiers of Austria and Russia. The Central Powers have only been temporarily deprived of the oilfields of Galicia, which are once more under their control. For the iron industry of Germany, next in importance to her own ores, are the ores which she derives from northern and central Sweden, and these she can still obtain, or could until quite recently obtain through the Baltic, from the ports of Lulea and Axelösund. It is true that during the winter the port of Lulea at least is closed, and the British fleet renders the Norwegian port of Narvik hardly available for the supply of Germany. Still the northern ores of Sweden can during that period also come down to Axelösund, the port for other iron ores, and one that can probably be kept open by ice-breakers all the winter through.

In connection with these resources attention should be called to two things. First, it should be noted that it is of the greatest consequence for Germany in time of war that the development of her iron and steel industries should have been favoured not only by the possession of and access to the raw materials just mentioned, but also by the enormous market provided for the product of those industries in her own rapidly growing population, as well as in the rich and populous countries all round less favourably placed for such production.

Secondly, we should bear in mind how the readiness of the people of Germany to submit to central control has greatly facilitated the husbanding of all their resources as well as their utilisation for the maintenance of German industry with an especial view to the successful prosecution of the war. Quite early in the war, you will remember, the German Government began to control some food supplies at a time when there was no lack of food, but simply with a view to possibilities at a more distant date. In a lecture which I delivered to our Society about a year ago, I pointed out difficulties likely to arise in connection with German agriculture, owing to the fact that so much female labour is already employed in agriculture in Germany that it was not easy to see how that class of labour could be further drawn on. I can now tell you as another illustration of the results of a passively accepted central management how that difficulty was got over, at least in the reaping of the harvest last year. The harvest is said to have been got in expeditiously with the aid of pupils in the higher classes of schools, and no

doubt both the seeding and the harvesting of this year's crop have been accomplished in the same way.[1] The statistics that are published from time to time with regard to the German iron industry show how actively it has been maintained nearly throughout the war, but perhaps the most striking illustration of the effect of the organisation of industry in Germany is to be found in the fact that the supplies of Chilean nitrate, of which Germany has been deprived through the action of the British fleet, have been, it is said, completely replaced by artificial nitrate made in Germany.

I turn now to the eastern theatre of war. Here there is a very different frontier from that upon the French side. It is throughout open, with hardly the defence of any very important river. There is indeed a natural defensive line for Russia proper formed by a nearly continuous series of rivers, but that lies a considerable distance within the Russian frontier. In the north we have the Niemen, the lower part of which flows from east to west into Germany, and the longer upper part of which flows from south to north. With a little break this defensive line is continued on the whole south-west and south by the Bobr, the Narev, the Bug, and the Vistula, the upper part of which last forms the boundary between Russian Poland and Galicia. This natural line of defence is strengthened by a number of fortresses, chiefly at important railway crossings. Beginning in the north, we have on the Niemen the fortress of Kovno, on the line from Vilna to Königsberg. Near the head of the Bobr there is that of Ossoviets, on the line running north-westwards from Brest-Litofsk. On the Bug, to the north-west of Warsaw, the most important of all these fortresses, is the fortress of Novo-Georgievsk, on a line running north-west to Thorn in Prussia. Finally, to the south-east of Warsaw, on the Vistula, on the line running south-west from Brest-Litofsk to Vienna, is the fortress of Ivangorod. Outside of Russia this north-south series of rivers is continued by the San, on which stands the Galician fortress of Przemysl. On the German side the principal fortresses are Königsberg, Thorn, and Posen, all important railway centres, but on this side the main thing to emphasise is the importance of the strategic railways. All round the frontier there lies at least one railway line, but the railway is in most parts double so as to present great facilities for the concentration of troops at any part of the frontier. On the Russian side this mode of defence may be said to be almost entirely wanting. The railways there radiate from inland centres to different points on the frontier, and of these there are few, only eight in all, and the network within the frontier is very open.

In spite of these disadvantages in respect of railway communication, Russian pressure upon the forces of the central European powers has been very severe from the very beginning of the war, and even in periods when the Russian forces were in retreat. The Russian move-

[1] "The Trade Possibilities of Germany and Austria-Hungary," by Isaac Wolf, Junior, President of the American Association of Commerce and Trade, Berlin, in the *Annals of the American Academy of Political and Social Science*, July 1915, p. 37.

ments of attack have been pushed furthest in the extreme north and in the south. The extreme north is a part that is close to the Russian capital. More than one attempt was made early in the war to take Königsberg. Eastern Prussia was overrun by Russian forces to a considerable extent, but here the geographical conditions exposed those forces to great danger. A large part of the country is composed of land with a very varied, though not very elevated, surface, and there is an intricate archipelago of lakes, the Masurian Lakes. After a dangerous advance in the month of August 1914, a long battle ended here in a disastrous Russian defeat on the 28th of August. But in the south, Galicia, the Russians from the first were remarkably successful, and they have never entirely lost their hold upon some part of Galicia. The line of advance in northern Galicia is that which led by the fortresses of Lemberg and Przemysl on to Cracow. Both of these fortresses were eventually taken, and the capture of the latter placed the Russians upon the left bank of the San, and also, it should be added here, gave them the command of two railways leading across the Carpathians, at the same time that it cut off the Galician oil supplies from Central Europe. From Przemysl the Russians continued to press forward, and at the same time succeeded in crossing more than one of the Carpathian passes. In this part of the theatre of war the Germans had for the most part left the defence to Austria, and the Austrian military machine has never shown itself anything like so efficient as that of Germany. One explanation of this is, perhaps, to be found in the fact that the Austrian Empire is composed of, and accordingly the Austrian army is derived from, a number of members fiercely hostile to one another, and again and again it has been pointed out by military correspondents that the rank and file of the Austrian army have no heart for the fight, and are extremely ready to give themselves up as prisoners. It is this fact that has often enabled the Russians to make prisoners from the Austrian army even when they themselves were in retreat. One important result of this failure of Austria to meet the Russian advance was the weakening of the Austrian invasion of Servia, from which their forces were ultimately driven out, Belgrade being recaptured by the Servians on the 14th of December last year. After the fall of Przemysl, and the advance westwards towards Cracow, the Germans found it necessary to take the situation in hand. The furthest advance made by the Russians in this neighbourhood was about the middle of April, and from that time onward the Russians were steadily and rapidly thrown back by the Germans in alliance with the Austrians, both in Galicia and further north in Russian Poland, as well as Russia proper. On the night of the 2nd and 3rd of June the ruined fortress of Przemysl was again occupied by the enemy, who was thus enabled to place guns on the right bank of the San. Lemberg was evacuated by the Russians on the 23rd of the same month, and in the month of August following the fortresses on the Vistula and Niemen all fell in quick succession, Warsaw being occupied by the enemy on the 5th, and Ivangorod evacuated by the Russians on the same date. Kovno, on the Niemen, was taken by the Germans upon the 18th, and Novo-Georgievsk upon the 20th. Subsequently the Germans

pressed further to the east and north-east. Brest-Litofsk, on the margin of the Rokitno Marshes, fell not long after Warsaw, and for some time Germany has been engaged in a series of operations round Dvinsk, on the river Dvina, upon the route to Petrograd.

Now with regard to these operations two facts may be noted. First, the initial success of the Germans in this series of operations is not perhaps to be wondered at. Germany, in consequence of her interior situation, has the advantage of being able to transfer troops rapidly from one theatre of war to another, and this fact, together with the special facilities afforded by the railway lines just spoken of enabled her to concentrate large forces with great rapidity on any point or points that she chose, enabled the Central Powers almost wherever they pleased hopelessly to outnumber the Russians. But it was perhaps more surprising that after they had got well within the frontier of Russia their advance should continue to be so rapid, for there they are under the same disadvantages as the Russians themselves through the paucity of the railways. It may be noticed as an additional disadvantage of this railway system that of the lines that here connect Germany with Russia only two, one from Vienna to Warsaw, and the other from Thorn to Warsaw, are upon the same gauge as those of Germany. But that is not so serious a disadvantage as it appears, seeing that the Germans have the means of rapidly adapting their rolling stock to the different gauge. The paucity of railways, however, is a disadvantage that remains in any circumstances, and I cannot but think that there can be no other explanation of the continued failure of the Russians in their own territory than that which is alleged, the deficiency of the munitions of war, and that deficiency in all probability is largely due to the destruction by fire, it is said, of several of their arsenals. It is, I suppose, matter of common knowledge that the great arsenal of Okhta, close to Petrograd, was destroyed about the beginning of these operations, and it is reported that several others were destroyed about the same time, owing, it is said, to fires originated by Germans.

But further, one has to notice that the success of these operations placed Germany in command of that strong line of defence formed by the rivers above described, and it is probably this fact that has given Germany sufficient confidence to be able to despatch a large body of troops southward to co-operate with Austria in pressing the invasion of Servia, where within the last few weeks the Austro-German army has made such alarming progress. It will be noted at the same time that the continued result of the pressure of the Russians makes this movement not altogether without danger. The Russians, as I have said, have from the first never been entirely out of Galicia. They have held the south-east throughout the war, the conditions there being peculiarly favourable to defensive tactics. The general slope of that part of Galicia is from the Carpathians seawards to the plains of Russia. But there is another slope from north to south, and it is that slope that is followed by numerous tributaries of the Dneister. All these tributaries have cut for themselves deep and narrow valleys through the Galician plateau, and it is the bluffs of these gorges that present greater facilities

for defence than even the rivers themselves. On the eastern bank of one of these gorges the Russians are able to hold back even a much stronger enemy, slowly making preparations for an irresistible attack, and if the Russians are obliged to retreat before the enemy's attack is delivered they are able to withdraw their forces and prepare an equally strong defence upon another similar bluff at no great distance. It will thus be apparent that the armies of the Central Powers advancing towards the Balkan Peninsula must always be more or less threatened by the presence of Russia on their left flank. It may be further pointed out that if this army eventually passes through Bulgaria by way of the Maritsa valley there will be the danger of that portion of their army having their communications cut off by the allied forces advancing from Salonika. I cannot enter into all the complications of the Balkan Peninsula, and that is all the less necessary since I hope you have all read the Editor's illuminating article upon that subject in the number of the *Magazine* for last June.[1]

It is impossible in the course of a single lecture to take a survey of the whole theatre of this vast field of war. Accordingly I pass over the Italian operations, merely mentioning that Italy declared war upon Austria on the 23rd of May, and I now propose to consider briefly the geographical conditions affecting the participation of our own country in the war. Of course the efficiency of that participation depended entirely upon our fleet. Even although we have brought to the land forces with the Allies an enormously larger force than was ever contemplated at the outset of the war, the landing of that force in France and elsewhere depended upon the security of the passage provided by our fleet, and one of the marvels of the war is how complete that security has been. I need not enlarge on the effectiveness of our fleet in maintaining our supplies of food and raw materials, or even on the completeness with which it eventually swept at least the surface fleets of the enemy from the open seas. At first, you will remember, great havoc was wrought by several isolated cruisers, more particularly the *Emden*, but the last of these disappeared from the seas with the internment of the *Kronprinz Wilhelm* in the United States on the 25th of April this year. One cannot of course remain blind to the fact that geographical conditions have been altered greatly to our disadvantage of recent years by the invention of aircraft and submarines. Although we are able to use these methods of attack also, it is obvious that we are in a position to lose more than the enemy in consequence of these inventions, the more formidable of which from our point of view is undoubtedly the submarine. Notwithstanding all that has been pointed out in regard to the small proportion of the total number of our mercantile fleet which the enemy submarines were able to destroy, I have never been disposed to belittle these means of attack, and I certainly heartily rejoiced when it came to be proved that the Admiralty had at last devised methods for coping with this danger.

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[1] Readers may now also be referred to the later article in the December number of the *Magazine*, vol. xxxi. p. 636, on "Macedonia: The Balkan Storm Centre."

It may now be pointed out that it is chiefly the alterations of geographical conditions due to the submarine that have led to the introduction of new precedents in international law in respect of maritime warfare. On the 4th of February 1915, Germany declared a blockade of the British Isles as from the 18th of February, which it attempted to carry out mainly by the means of submarines. This blockade was of course wholly ineffective, but it led to an intimation by Great Britain and France on the 1st of March that they, in their turn, would prevent all commerce whatever from reaching Germany by sea. This was in effect a declaration of the blockade of the whole German seaboard, but neither could that be rendered effective, and the truth is that modern conditions of warfare have made an effective blockade a thing of the past. In consequence of these steps this country has been brought into controversy with neutral countries, more particularly the United States, which points out, among other things, that a blockade to be effective ought to act equally against the commerce of neutral countries, whereas Norway, Sweden, and Denmark are all able to carry on maritime commerce with Germany quite freely, and it is only those countries whose ships have to approach Germany and neutral ports giving access to Germany by way of the Straits of Dover or the northern routes round the British Isles that are prejudicially affected by this so-called blockade.

But if our fleet cannot wholly cut off the Baltic trade of Germany its dominance at sea elsewhere is, as already stated, complete. Nevertheless we cannot but recognise certain geographical difficulties arising from the way in which the Empire is scattered all over the world, with the fronts to different seas, as well as the loss of time involved in distant naval operations as compared, for example, with the celerity with which Germany and the Central Powers are able to change the scene of their operations through their command of internal railways. The entry of Turkey into the war at once brought Britain face to face with new and serious difficulties. The first overt hostile operation of that country was the bombardment of the Russian ports of Odessa and Feodosia on October 29, 1914. This led to a declaration of war on the part of Britain against Turkey on the 5th of November, which was immediately followed by the annexation of Cyprus, and some time later (December the 17th) by the declaration of Egypt as a British Protectorate, and the deposition of Khedive Abbas Hilmi and the appointing of his uncle, Prince Hussein, as Sultan of Egypt under British rule. This led to preparations being at once made for the defence of the Suez Canal, and afterwards to operations being carried on at places so far distant as the Dardanelles and the Persian Gulf. As to the aims of the Dardanelles expedition there can be no doubt. Those aims are obviously fourfold. First, to secure an outlet for Russian grain and other produce, a step which, besides increasing our own supplies of these commodities, would of course enormously strengthen our Empire in consequence of the high price such commodities can now command; second, to facilitate the supply of munitions of war to Russia; third, to be in a position to keep in check the Balkan States; and fourth, to draw away

the Turkish forces from the Suez Canal. This last object is probably one of the main aims of the Persian Gulf operations, which are obviously not of such a nature to have much direct effect upon the final event of the war, although we recognise how important it is for us to retain a hold on the southern outlet of the Baghdad railway.

One other thing may be pointed out in conclusion. Unquestionably one of the most striking things in this war has been the whole-hearted manner in which all the members of the Empire have joined in with us to prosecute this war. And in that also it seems to me a certain geographical significance may be recognised. Our Empire is scattered all over the world with numerous seaboards giving it opportunities of trading with every other seaboard, and inevitably begetting the desire on the part of the self-governing portions of the Empire to have complete control of their commercial relations. More than a century ago the attempt of the mother country to establish control over the commercial relations of her plantations in America was among the chief causes which led to these plantations breaking away. That gave us a lesson, and we took it to heart. We now see the results of a policy the example of which may perhaps induce other countries that follow a different course to imitate it. But it is also to be noted that this policy has caused the outlying portions of the Empire to feel that in this war they are fighting in their own interests; has caused more particularly Australia, New Zealand, and South Africa to feel that they are fighting for their own freedom against a power which could not be expected to respect their liberties if it were victorious.

THE WHANGIE AND ITS ORIGIN.

By G. W. Tyrrell, A.R.C.Sc., F.G.S., Lecturer in Geology, Glasgow University.

(*With Illustrations.*)

The Whangie is situated at the north-western extremity of Auchineden Hill, which itself forms the north-eastern buttress of the volcanic plateau of the Kilpatrick Hills. The name is applied to a huge fissure which separates a slice of rock from its parent mass in one of the great cliffs so common in the volcanic plateau (Fig. 1). This "landslip," as it is called, has attracted much attention from lovers of the picturesque, and is a favourite rendezvous for picnic parties in the summer, and for the hill walker at all seasons. It may be reached from Blanefield Station, from which it is about five miles westward; or from Milngavie, from which the route is *via* the Drymen Road, and the walking distance about seven and a half miles.

The name "Whangie," "Wanzie," or "Quhanzie," as it is sometimes called, seems to be derived from a Scottish word meaning a "slice"; and if so is aptly descriptive of the phenomenon to which it is applied.

Many good descriptions of the Whangie have been written. A recent one appears in Macdonald's *Rambles about Glasgow*. Older accounts are to be found in the *Statistical Account of Scotland*, vol. viii., 1845; and in David Nimmo's *History of Stirlingshire*, vol. ii., 1817. In describing the Whangie I cannot do better than quote these accounts, both of which

Fig. 1.—The Whangie, entrance to fissure from the north. Height of man (six feet) standing on top of the cliff gives the scale. (*Photo S. Finglaud.*)

contain important information bearing on the origin of this so-called landslip.

The description in the *Statistical Account of Scotland* (p. 62) is as follows:—

"In the trap formation, near the south end of the parish [of Killearn], there is a singular chasm called the Wanzie. A transverse section of a hill, running east and west, seems to have slipped off, probably from the partial decay of the subjacent sandstone leaving it without support. The width, where greatest, is 10′ 2″, where least, 2′ 6″. The depth at present is about 30′, but as the bottom is filled with rubbish it may originally have been much greater. It takes a zig-zag direction, and it is easy to mark the exactness with which the angles and surfaces on one side answer to those on the other (see Fig. 2). There were many

fissures in the same hill, which have been filled up by the tenants since the introduction of sheep. Near the north corner of the hill there is still one left open, running in a zig-zag direction, 185 feet in length, and generally 6 inches in breadth."

The observer in this account appears to have been misled as to the direction of the fissure, which runs north and south, not east and west.[1]

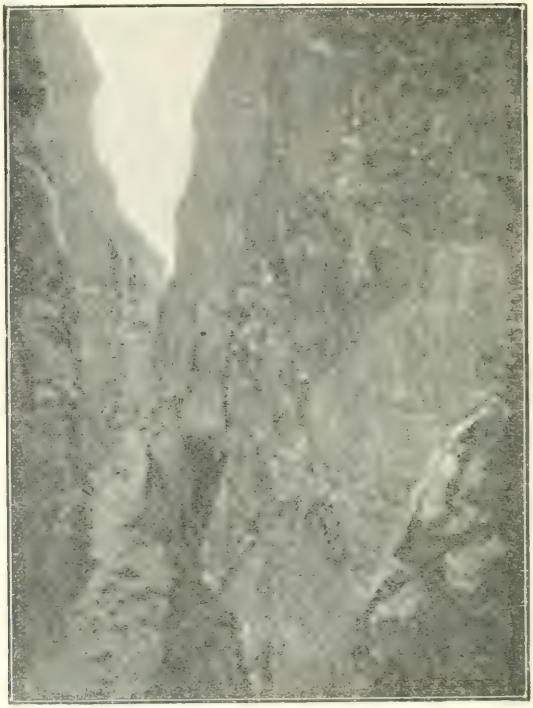


Fig. 2.—The Whangie, inside the fissure, looking south. Note correspondence of sides, and the curved surfaces ("backs") along which the fracture has taken place. (*Photo H. Fleck.*)

In Nimmo's *History of Stirlingshire* (vol. ii. pp. 607-8) we have the following account :—

"A slope from Strathblane, rising west a thousand feet in two miles, is terminated by a precipice of at least 150′ from north to south. Here the face of the rock, as if unsupported on the western side, has separated from the mountain, forming a crevice 60′ deep, near 200′ long, and in width from 14′ to 15′ at the north end, and 2½′ at the south. The slice is of unequal thickness, in some places about 20′, in others 3′ or 4′. In one or two parts it has totally fallen away, leaving narrow openings (see Fig. 1) through which, as from the embrasures of a castle, the spectator can look down on the immense fragments of rock with which the

[1] The direction, however, may refer to the hill, and not to the fissure.

ground below is covered (see Fig. 8). The impression made by this striking object is that of a rock split by an immense wedge. The angular surfaces of the opposite sides leave no room to doubt of their having once adhered and fitted each other."

It will be noted that these accounts are discrepant, especially in the matter of the dimensions of the fissure : but the figures vary for different positions, and the observers may not have taken the measurements in the same places.

These two accounts give the essential features of the phenomenon, and there is little for the present-day observer to add. It should be remarked, however, that the base of the severed slice is embedded in a steeply-sloping bank of grass-grown talus, on which are scattered the huge fallen blocks of Nimmo's account. The correspondence of features,

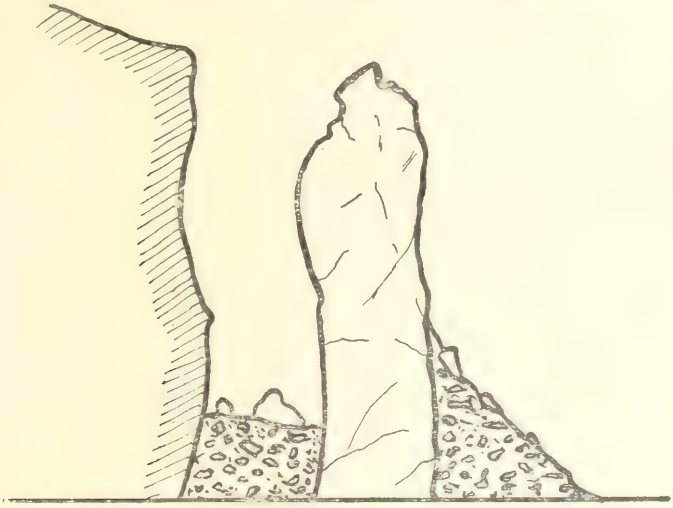


FIG. 3.—Diagrammatic cross-section of the Whangie, showing correspondence of features on either side of the fissure, and slight raising of the severed slice.

such as angles, bulges, and depressions on either side of the fissure, as mentioned in both of the above accounts, is certainly very striking (Fig. 2). A very remarkable point, however, seems to have escaped the earlier observers. It is that, at one place, these features prove that the severed slice is slightly higher than the parent mass, and that in moving away from the cliff it has also moved upwards. In many places the separation of the slice has taken place along the curved surfaces of rock known to quarrymen as "backs." These backs are sometimes crossed by rounded horizontal ridges : and it is by the comparison of these ridges with the corresponding grooves on the other side of the fissure that the relative elevation of the severed slice may be proved (Fig. 3).

This feature might be explained by the lateral or longitudinal tilting of the severed block, just as is often seen in the collapsed portion of a stone pier or a sea-wall. A longitudinal tilt might elevate one end of

the block above the corresponding features on the face from which it has slipped (Fig. 4a). But in this case the corresponding features on the sides of the fissure, such as the horizontal ridges mentioned above, would depart from parallelism. There is no such departure, however, in the Whangie fissure, at least in the portions which admit of comparison between opposite sides, and accordingly a longitudinal tilt is disproved.

A lateral tilt (Fig. 4b) might result in a slight elevation of the severed portion, especially if it were thick. In this case, however, the fissure should become wider towards the top. This is actually the case in some parts of the Whangie fissure, but only where the upper portions of both block and cliff-face have been broken and disintegrated, and fallen blocks have made the bottom of the fissure less wide than formerly. Where the rock is still intact, and the sides of the fissure correspond

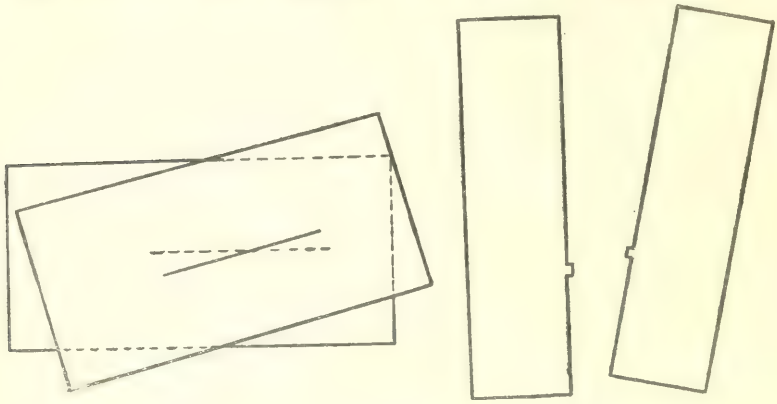


FIG. 4a. FIG. 4b.

Diagrams showing effects of longitudinal and lateral tilting of blocks.

from top to bottom, the parallelism is almost exact, and no noteworthy lateral tilt can be postulated (see Figs. 1 and 2).

Origin.—The Kilpatrick Hills are built of a series of gently inclined lava flows, which have been ejected from a row of vents along the northern and western edges of the plateau. Each flow forms a well-marked terrace terminating in a cliff, resulting in a remarkable step-like profile which can be seen from any suitable view point (Fig. 5). The Whangie fissure apparently occurs in one of these steps, which have been worn back by denudation along the soft band of vesicular material which separates contiguous flows. Sometimes, however, beds of tuff or volcanic detritus are found between the flows.

The current explanation of the Whangie is that it is a landslip along either the soft weathered material or a bed of tuff at the base of the flow which is supposed to form the rock of the Whangie. In Nimmo's account reference is made to a probable slip upon a subjacent bed of sandstone. This view, however, is open to insuperable objections. First of all, no bed of tuff, or zone of soft vesicular material, or of sand-

stone, is exposed anywhere near the base of the Whangie, and there is no evidence that such exists. There is certainly tuff and sandstone at the base of the volcanic platform: but the Whangie hill rises not on the lowest but on the third lava-flow from the base. Secondly, on this view, the severed slice has slipped in a direction opposed to the dip of the flows, which is prevalently south-east. Third, there is positive evidence that the rock of the Whangie is not a lava flow at all, but that it is a volcanic intrusion or plug which descends to the depths, and can therefore have no tuff or vesicular material beneath it in the required position. When viewed from the south it is obvious that the Whangie hill, instead of conforming to the step-like profile, cuts across the outcrops of the third and fourth flows of Auchineden Hill, and is therefore intrusive (Fig. 6). There are one or two other vents near by, which pierce the Calciferous Sandstone lying below the lavas, and it is almost certain that the Whangie hill is a lava-filled vent which pierces the lavas

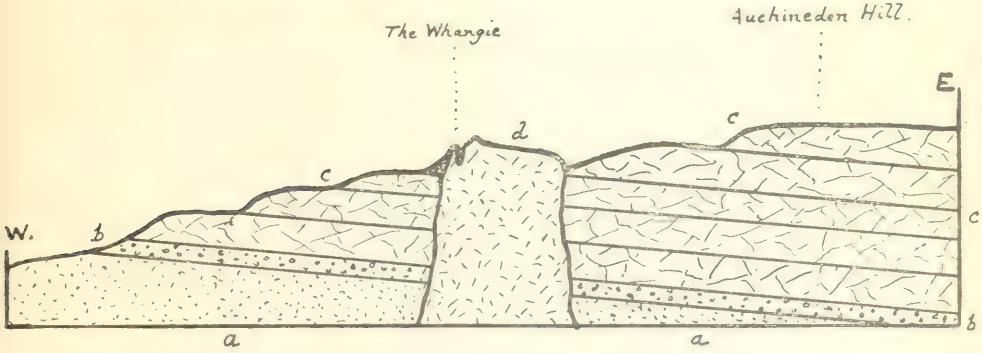


FIG. 5.—Geological section across volcanic plug of the Whangie Hill: *a*. Upper Old Red Sandstone; *b*. Tuffs; *c*. Basaltic lava flows; *d*. Volcanic plug (basalt).

themselves. This is the view also taken by the Geological Survey officer (Mr. G. W. Grabham) who surveyed this area some years ago.[1] Finally, a settling or slipping under the influence of gravity would mean a resultant downward movement of the severed slice, but this does not appear to have taken place.

The separation of this huge slice of rock, which has moved slightly upwards, or at least horizontally, for an average distance of four feet outwards from the face of the cliff, would require a certain measurable amount of energy. Now this energy could not have been supplied by gravitation, which acts uniformly downwards. We are thus led to inquire from what other source the required energy might come. Apparently the only other adequate source is an earthquake vibration, which may act horizontally or in any direction.

Now, in unsupported ground, such as a cliff-face or escarpment, an earthquake shock frequently brings about a landslide. The earthquake

[1] *Summary of Progress of Geological Survey for* 1905 (1906), p. 138.

motion is transmitted from particle to particle of the rock, and each particle vibrates through a small amplitude. The vibration is resisted by the juxtaposition of the neighbouring particles. But where the impulse passes out from a cliff-face into the air, the vibration is transformed from molecular to molar movement, and the outer slice of rock tends to move away from the cliff. If the rock is fissured or jointed, or of weak cohesion in any way, this separation is much facilitated. If, however, it is tough, massive, and unfissured, it may resist the jerk or jolt of the earthquake shock and remain intact. The principle is just the same as that which operates when the first of a row of marbles in close contact is struck. The force of the blow is transmitted through the row, and it is the last marble in which the force of the blow is transformed into movement. Another illustration is that of a row of

Fig. 6.—The Whangie Hill, from the south. Shows that the Whangie intrusion cuts across the outcrops of two lava flows. (*Photo G. W. Tyrrell.*)

boys each of whom has his hands resting on the shoulders of the boy in front. A push applied to the last in the row is transmitted to the first, who, being unsupported, falls forward.

Such landslide phenomena are common effects of earthquake shocks, and in general the rock or earth dislodged is unsupported beneath and falls downwards. Frequently the whole mass disintegrates into large and small fragments which slump down into the tumbled aggregate so characteristic of landslide topography. It is frequently impossible, therefore, to distinguish the landslide effects due to earthquake shock from those due to gravitation alone. It is only under special circumstances, such as those outlined below, that the severed slice indicates the direction from which it received the shock, and gives a clue to the agent involved in its severance.

Suppose, however, the cliff-face to be mantled in a sloping accumulation of loose débris. Unless the severed slice were bodily overthrown,

or disintegrated into small fragments, it would not tend to fall downwards as a whole, but would rather tend to be driven forward on and through the accumulation of débris, and the resistance of the débris might even force it to take a slight upward movement. An upward movement of the severed slice might be imparted by a slight inward inclination of the fracture-plane at its base, as shown in Fig. 7. The block would ultimately come to rest on a bed of débris, and in favourable circumstances would retain its perpendicularity and parallelism to the cliff-face.

This, then, is conceived to be the mode of origin of the Whangie. It is probable that a partial shattering took place at the same time, giving rise to the fallen blocks which strew the slopes below, and breaking the severed block itself at the northern end. It is noteworthy that there are numerous small landslips of the normal type along the

Fig. 7.—Conjectural section across Whangie to show supposed mode of support, and cause of the slight uplifting of the severed slice.

steep northern escarpment of Auchineden Hill. Here the severed portions have been broken to pieces, and now show the peculiar confused and tumbled landslip topography.

Some confirmation of earthquake origin may be derived from the fact mentioned in the *Statistical Account of Scotland*, that there were many fissures in the same hill (by which is probably meant Auchineden Hill), but that all save one had been filled up on the introduction of sheep. At this date (1845) one was still left open near the north corner of the hill. This fissure was said to run in a zig-zag manner, and was 185′ in length by 6″ in breadth. This, however, does not seem to be in existence at the present time, and has probably also been filled up. Such fissuring is a common accompaniment of earthquake shocks, and may or may not be accompanied by vertical movement on one side of the fissure. The Kilpatrick Hills, with their cliff and terrace topography, would be very susceptible to earthquake fissuring. When a fissure opens up in this way without vertical movement on either side, the result resembles, on a small scale, the phenomenon of the Whangie. A possible alternate

explanation of the difference of elevation of the sides of the fissure is that there has been a slight faulting movement.[1]

The fissure appears to have opened up along the broad, curved surfaces known as "backs." This kind of fracture appears to be developed only by a shock of some kind, such as blasting, and as far as my observation goes it is never seen in a natural section due to erosion. It is especially well developed in quarries and other excavations in which a large amount of blasting is done, and only occurs in compact igneous rocks. Fine examples are to be found along a road leading up to Craigallian, two and a half miles north-north-west of Milngavie: and were also seen in a puddle trench excavation in the Calciferous Sandstone lavas at North Third, near Bannockburn. The following is a description of the latter occurrence:—

"These backs consist of large, smooth, curved surfaces, of any size from one to twenty feet in diameter. These surfaces are sometimes crowded together, forming a series of concentric, spherical shells of rock, from which occasionally large, curved plates about ½-inch thick may be broken off. The smooth surfaces of the backs are sometimes crossed horizontally by a few blunt, rounded ridges.

"These surfaces are not developed by weathering, but only become apparent on fracture. The authors believe they are due to a series of concentric surfaces of weak cohesion developed during cooling, which, while they cannot be detected in the unweathered, unbroken rock, control its fracture when broken by such a violent means as blasting."[2]

The similar surfaces of fracture in the Whangie fissure (see Fig. 2) have probably also been caused by shock; but as blasting is out of the question, a severe earthquake vibration seems to be the only other adequate cause.

The explanation of the Whangie fissure adopted here requires the formation of a talus-slope of loose débris. The rock of the Whangie plug is easily decomposed, and on weathered surfaces is seen to break easily along numerous joint-planes, giving rise to small, angular fragments. The severed slice itself is fast breaking away in many places (Fig. 8), and it is only near the south end of the fissure that the "backs" are preserved in their original smoothness. It is probable then that the original cliff-face of the Whangie hill was mantled in a slope of loose débris as is required on the hypothesis adopted here.

The retention of the "backs" in some parts of the Whangie fissure gives it an appearance of extraordinary freshness and recency, and I do not believe that, geologically speaking, it can be very old, perhaps not more than a few hundred years. The account given in Nimmo's *History of Stirlingshire*, dated 1817, has a footnote appended to this effect: "We have given in the text the spelling in writs 200 years old. The word is perhaps from the Scottish 'Whang,' signifying slice." The Whangie was therefore in existence in 1617: but Dr. David Murray

[1] See *The Earthquakes at Yakutat Bay, Alaska, in September* 1899, by R. S. Tarr and L. Martin. Professional Paper No. 69, U.S. Geol. Survey (1912). Plates xvii. and xvi. B.

[2] Tyrrell and Martin, *Trans. Geol. Soc., Glasgow*, vol. xiii., part ii., 1908, p. 243. See also plate xiii., fig. 2.

to whom I applied for information on this question, informs me that all writs relating to land in Scotland have been registered since the year 1617, and that there are other registers extending back to a much earlier period. It is possible, therefore, that more information as to the age of the Whangie may be obtainable from the study of these documents. Dr. Murray considers that the name does not affect the question, as it probably applies to the place quite as much as to the rift in the rock. It seems to me, however, that a name which means "slice" must have been given because of the fissure. Dr. Murray also thinks that if the landslip took place as recently as, say, three hundred years ago, there would have been some record of it or some tradition. But the landslip took place in a bleak and lonely spot, remote from human habitation even now, and more so in earlier times. It may easily have escaped notice for

FIG. 8.—The Whangie, western front, showing broken and fissured condition of rock, and boulder-strewn talus-slope. (*Photo S. Fingland.*)

a long period. The absence of tradition centring around this phenomenon might serve equally well as evidence for its recency as for its age. Much lesser phenomena in Scotland and other countries have legends and traditions attached to them. It is astonishing that the Enemy of Mankind, for example, has not been named in tradition as the author of the Whangie. It is just the place where the fiend, "tired of his dark dominion," might have alighted on the earth, and split the ground with the impact of his fall. The absence of any such tradition might be taken to imply that the slip took place at a period later than that in which the devil took such a prominent part in terrestrial, and especially in Scottish, affairs.

Assuming that the hypothesis adopted in this paper is correct, and that the Whangie is of earthquake origin, also assuming that it is com-

paratively recent, it becomes of interest to inquire whether there has been any severe earthquake in this part of Scotland during the last few hundred years. In Calderwood's *History of the Kirk in Scotland* is given an account of a great earthquake which shook a large part of Scotland, and was especially felt at Dumbarton. The date is 1608, and the account runs thus: "Upon the 8th of November there was an earthquake at nyne houres at night, sensible eneugh at St Andrewes, Cowper, Edinburgh, Glasgow, Dundie, but more sensible at Dumbartane; for there the people were so affrayed that they ranne to the kirk, together with their minister, to cry to God, for they looked presentlie for destructioun. It was thought that the extraordinar dreuth in the sommer and winter before was the caus of it." Dr. David Murray, in a letter, to the *Glasgow Herald* (20th December 1910), remarks that the people of Aberdeen were much alarmed by this shock, and a day of fasting, humiliation, and prayer was appointed by the magistrates and clergy. The particular sin which was supposed to have brought this judgment upon the town was salmon-fishing on Sunday; and the salmon-fishers of Aberdeen were accordingly brought before the Session and rebuked.

It is clear that this earthquake was severe, and we may conclude from its effects at Dumbarton that its epicentre may have been situated near this town. It is just possible that it was this earthquake which caused the rift of the Whangie, and the accompanying landslide phenomena and fissuring of the Kilpatrick Hills.

THE BURRINJUCK DAM AND THE MURRUMBIDGEE IRRIGATION AREA.[1]

By JOHN M'FARLANE, M.A.

(*With Sketch-Map and Illustrations.*[2])

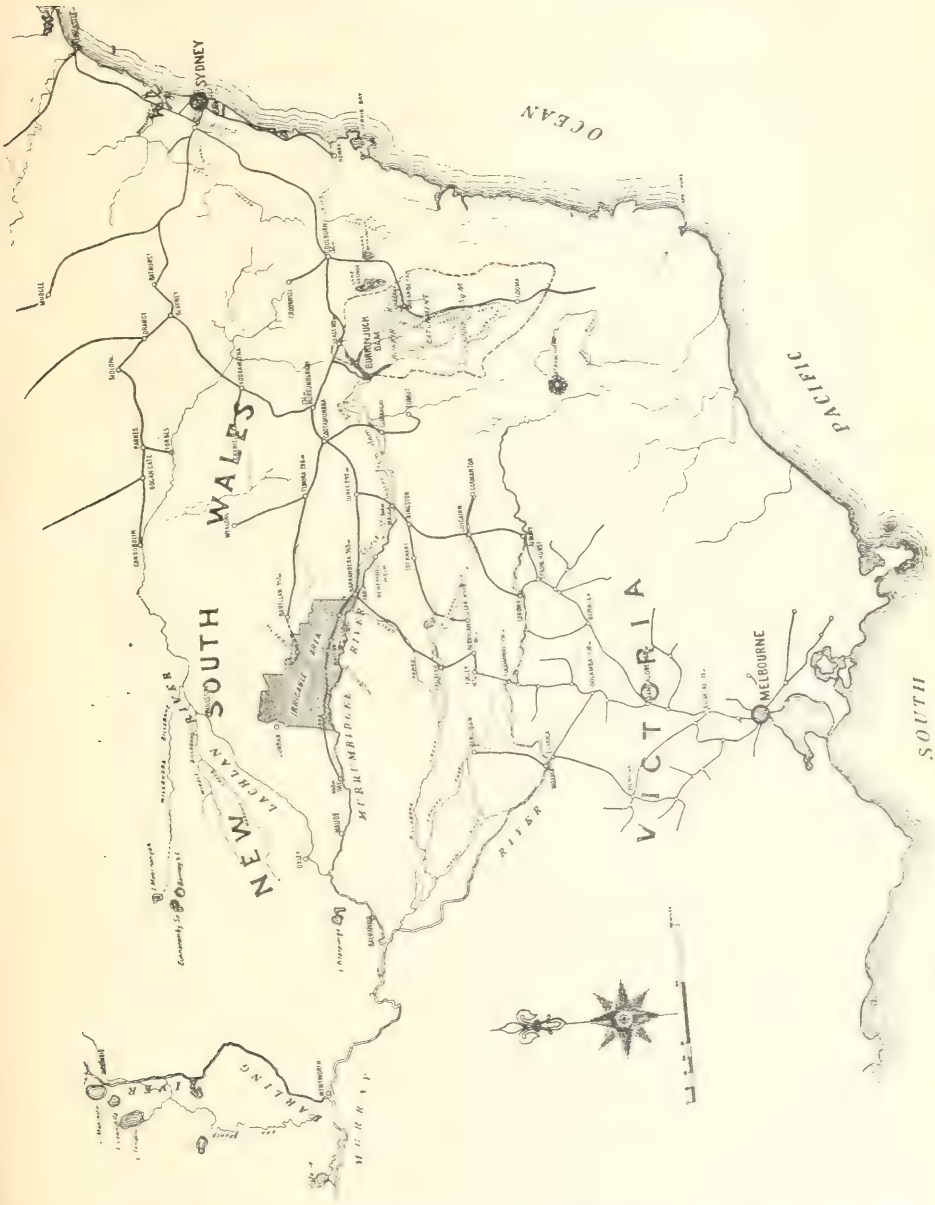
IN the Presidential Address which he delivered at Adelaide in 1914 to Section E of the British Association, Sir Charles Lucas dwelt upon the important part played by man as a geographical agent. No subject could have been more appropriate in Australia, where human action is altering in no uncertain way the appearance of the land as designed by Nature. The effect on man himself is no less important, and in the interaction which takes place between him and his environment, his political, economic, and social activities may all undergo change. A visit which the present writer paid to the Burrinjuck Dam and the Murrumbidgee Irrigation Area afforded some interesting illustrations of this human response to geographical control.

The Murrumbidgee Irrigation Area (*see map*) is situated on the western plains of New South Wales, and runs in a north-westerly direction from a

[1] A paper read before the British Association at Manchester, September 1915.

[2] I am indebted to my friend Mr. D. M. S. Watson for the photographs.—J. M'F.

point on the Murrumbidgee, a few miles below the town of Narrandera. The soils are generally fertile, consisting as they do of river silts which



Sketch-map to show position of Burrinjuck Dam and the Murrumbidgee Irrigation Area.

have been deposited during times of flood; but the most productive are those which lie at the base of some low hills to the north of the river. The rainfall does not average more than 16 inches per year, of which

9 inches fall between September and April. The vegetation varies in character from open woodlands, in which the native pine, helar, mallee, and box are the most important trees, to typical steppe lands, the grasses of which become dry and parched before the end of summer. Until quite recently the greater part of this region was almost entirely devoted to pastoral pursuits, the land over large areas carrying about one sheep to two and a half acres. With the development of New South Wales, however, men's thoughts naturally turned to the possibility of utilising the waters of the Murrumbidgee for agricultural purposes. The problem which had to be faced was by no means an easy one. Irrigation is most necessary during the summer months, but it is precisely at that period of the year that the river is at its lowest, and water cannot be withdrawn

Fig. 1.—The Murrumbidgee above the Dam.

on an extensive scale without seriously interfering with navigation on the Murray in South Australia. Large storage works were therefore essential in order that the excess water in the Murrumbidgee at certain seasons of the year might be conserved for use during the summer months.

Several factors determined the site and character of the storage works which were eventually agreed upon. Practically the whole supply of water in the channel of the Murrumbidgee is contributed by the catchment area above the town of Gundagai, which is situated below the confluence with the Tumut. The basin of the river above Gundagai has an extent of 8000 square miles lying on the western slopes of the highlands, at an elevation between 2000 and 5000 feet above sea-level. Here the climatic conditions are very different from those which prevail on the western plains. On the lower lands, it is true, the rainfall does

not exceed 20 inches, but on the higher summits, where snow generally lies during the winter months, the annual precipitation averages 70 inches. In spring the river attains its maximum height as a combined result of melting snow and heavy rain; in summer, when it is at a minimum, it derives its supply from springs and swamps scattered over the catchment area. Unfortunately the nature of the country round Gundagai did not permit the construction of storage works there, and the regulation of the waters of the Tumut could not be included within the scheme. Further up the Murrumbidgee, however, at Burrinjuck,

FIG. 2.—Dam as seen from the slope of Burrinjuck.

just below the confluence with the Goodradigbee, almost ideal conditions prevailed for the construction of a great dam, and this was the site which was ultimately chosen. Above their confluence the Murrumbidgee and the Goodradigbee flow in wide open valleys, while just below it the combined river makes its way through a deep gorge formed by the granitic rocks of Burrinjuck on the north and of Black Andrew on the south. Across this gorge the dam (Fig. 2) has been thrown. When completed it will have a maximum height of 240 feet, an upper length of 752 feet, and a base thickness of 170 feet, tapering at the top to 18 feet. The lake, which will be formed by the dam, will have an area of 13,000 acres, and will run up the Murrumbidgee about 40 miles, up the Goodra-

digbee about 13 miles, and up the Yass about 11 miles. The total amount of water impounded from an area of about 5000 square miles will be about 33,000,000,000 cubic feet, or, as is frequently pointed out in Australia, an amount more than equivalent to that which is contained in Sydney Harbour. These figures indicate that the Burrinjuck reservoir is justly entitled to a place among the great irrigation works of the world. Its completion has been somewhat delayed by the discovery of soft seams in the hard rocks on either side, and the difficulty of finding suitable foundations for the flanks of the dam. These obstacles have now been surmounted, and the work is being pushed on to a speedy conclusion.

The construction of the dam has involved the creation of a small

Fig. 3. An irrigation ditch on the experimental farm.

town rather picturesquely situated on the northern side of the gorge. It is known as Burrinjuck City, and is mainly occupied by officials and workmen. A two-foot gauge railway, which connects it with Goondah on the Southern line, affords the means by which all the material used in the building of the dam has been conveyed to the spot. As the lake which is being formed lies amidst some of the most beautiful scenery in Australia, and promises to offer excellent facilities for fishing, it is not improbable that holiday resorts may ultimately grow up at various points on its margin.

We now turn to a consideration of the Irrigation Area, which lies more than 100 miles to the west of Burrinjuck. The river itself makes a detour to the south, so that the water when released from the reservoir has to flow about 220 miles before it reaches Berembed, a short distance above the town of Narrandera. At Berembed a weir has been con-

structed, and from there the water withdrawn is led by means of a channel past Narrandera, and then along the base of the low hills which, as already mentioned, lie to the north of the river. Various branch canals, and a whole network of subsidiary channels (Fig. 3), convey the water to all parts of the region which is to be irrigated.

The total area which has been acquired for the purposes of the scheme amounts to 1,250,000 acres. Of that it is proposed to irrigate about 250,000 acres, and to use the remainder as dry lands in conjunction with the land under irrigation. Farms were first allotted in July 1912, and by the end of December 1914 more than 800, with an aggregate area of 36,000 acres, had been granted. It is estimated that when the Irrigation Area has been fully developed it will provide for nearly 7000 farms, and will support about 100,000 people. The farms vary in extent from 2 to 200 acres. Those of 50 acres and less have a water-right attached to each acre, while those of more than 50 acres have up to 80 water-rights attached. The total water-right belonging to each farm is definitely specified when the land is thrown open to settlement, and varies according to the purpose for which it is deemed suitable. The water is paid for at the rate of 5s. per acre-foot, but additional supplies may be purchased during the irrigation season at the same rate, if there is any to spare. The settler holds his farm on a perpetual lease, the rental charged being at the rate of $2\frac{1}{2}$ per cent. per annum on the capital value. At the end of the first twenty-five years, and of every subsequent twenty years, that value may be reassessed and fixed at the actual unimproved value of the land at the time of its revaluation. The following figures, taken almost at random from a list of farms available during the past year, will illustrate these points :—

Farm Number.	Total area.	Capital value for first period of 25 years.	Annual Rental for first period of 25 years.	Water rights.	Annual Water rate.
	A. R. P.			Acre-feet.	
570	2 1 18	£106 6 3	£2 13 2	6	£1 10 0
145	45 0 0	1192 10 0	29 16 3	45	11 5 0
797	164 1 0	2299 10 0	57 9 9	80	20 0 0

Fruit-farming, dairying, and stock-raising are among the principal pursuits of the area. Citrus fruits, such as oranges and lemons, vines, apricots, peaches, walnuts, and almonds, are all, or will all be, important crops. Lucerne, which grows throughout the year, and of which six or seven cuts may be annually obtained, provides the necessary food for dairy cattle. Pigs are fed upon maize, lucerne, and root crops. Vegetables, which are cultivated mainly by the small holder, include peas, beans, and tomatoes. There is at least one promising ostrich farm, which is of course situated partly on the dry area (Fig. 4).

Economic, political, and social conditions all differ from those to which we are accustomed in an ordinary farming country. The whole administration of the area is in the hands of a Commissioner appointed by the State, and his powers are much more extensive than might at

first be suspected. Farming, to be profitable under an irrigation system, must be intelligent and it must be intensive. But very few of the settlers have come from districts where irrigation is practised, and it is necessary for the administration to teach them how to proceed. An experimental farm has been established, and the progress which has already been made upon it affords the highest hopes for the future of the whole region. Instructors skilled in the agricultural methods of irrigation areas have been engaged to give help and advice whenever it is required. Assistance has also to be provided in other ways. Comparatively few farmers have financial resources sufficient for the intensive development of their holdings. Accordingly, the Commissioner erects their houses and farm buildings, grades their land, provides them with

Fig. 4.—Ostriches on unirrigated land.

fruit trees, grants loans of money, and helps them in various ways during the first few trying years. For these services repayment has, of course, to be made.

The distance of the Irrigation Area from the chief cities and ports of Australia is the cause of certain difficulties connected with the marketing of the produce. The small cultivator, engaged in the production of perishable commodities, would, for one reason or another, find his markets inaccessible or unprofitable. To overcome these difficulties the Commissioner has established a creamery, a bacon factory, and a fruit and vegetable canning establishment. To these many of the settlers sell their milk, pigs, and garden produce.

The Commissioner is also responsible for the urban development of the area. Leeton and Griffith are to be the principal towns. The former, which is already of some importance, is situated in the east, about three

miles from Yanco Siding on the Southern Railway. Griffith is to lie at the foot of the Macpherson Range, further to the north-west, but its development will not be undertaken until the railway from Barellan has been completed. Both towns have been planned on modern lines by the designer of the Federal Capital at Canberra, and in the streets of Leeton trees which will provide a welcome shade in summer have already been planted. Local government does not yet exist, and the Commissioner undertakes the supply of domestic water, sanitation, lighting, and various other public services.

The conditions of social life also present some striking contrasts to those which prevail in an ordinary farming district. The population is relatively dense, and there is none of that isolation, trying for men but doubly trying for women, which is so characteristic of many agricultural areas in the more recently developed parts of the globe. Churches and schools, libraries and places of amusement are within easy reach of all, and there is every prospect that a vigorous communal life will speedily develop.

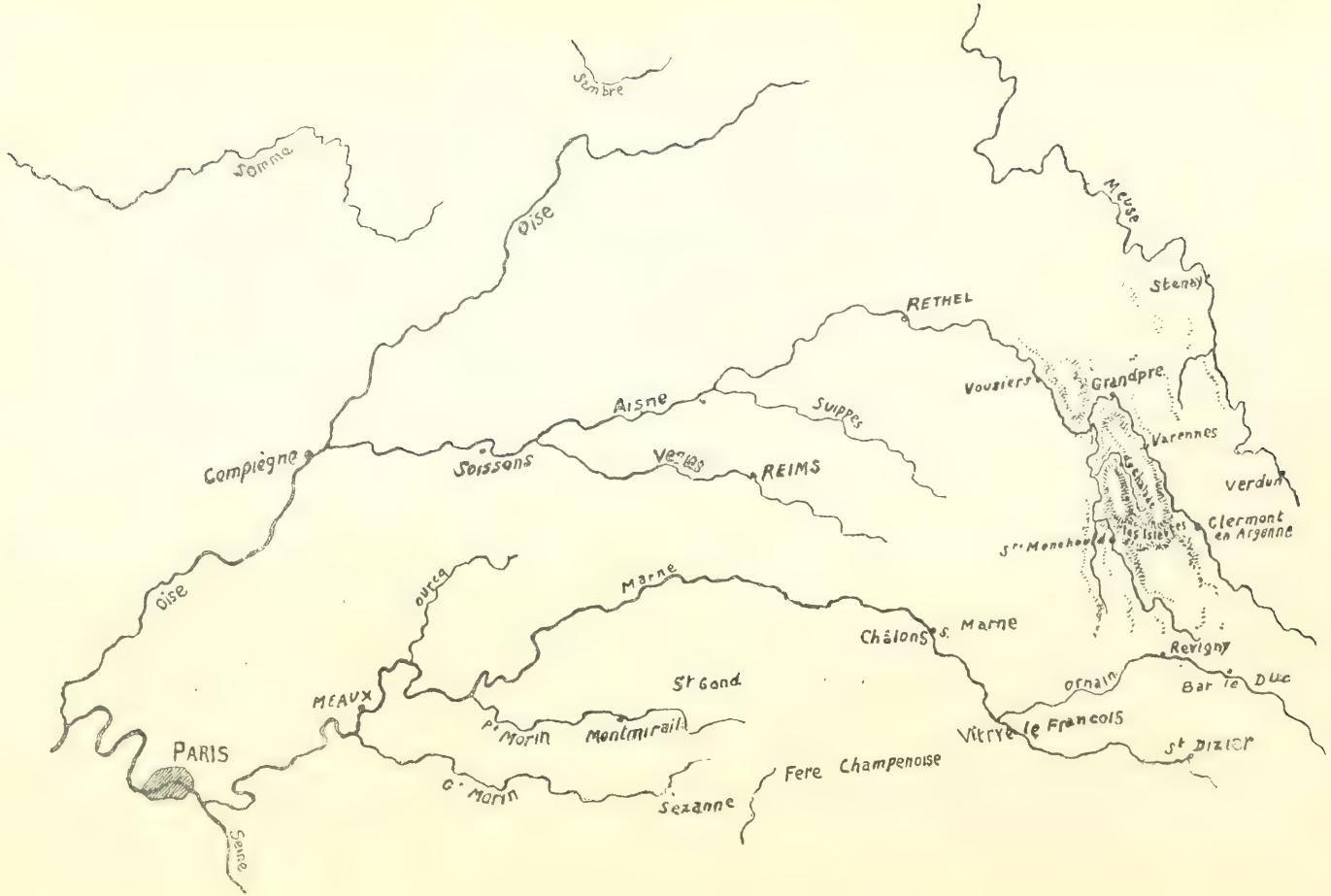
It is yet too early to dogmatise on the success of this great experiment upon which the state of New South Wales has already spent a sum of £3,000,000. But the impression left upon the visitor is undoubtedly favourable. The first few years, it is true, will demand strenuous labour from all concerned. Much will depend upon the administration, and the Commissioner and those associated with him are obviously devoting all their energies to the development of the area. Much will also depend upon the settlers and their ability to adapt themselves to their new conditions of life and work. For the geographer the main interest lies in the interaction between man and his environment. The progress of irrigation is sometimes adduced as evidence of the weakening control exercised by geographical factors. No evidence could be more invalid. Nature does not allow man to act with impunity, and he does not alter natural conditions without himself undergoing change.

THE GEOGRAPHY OF THE BATTLE OF THE MARNE.

(*With Sketch-Map.*)

In the *Bulletin* of the Geographical Society of Toulouse for 1914, which has only reached us recently, there is an interesting communication by M. le Commandant Litre on the part played by geography in the battle of the Marne, illustrated by a sketch-map which we reproduce here.

M. Litre points out in the first place that although there has been a greatly increased interest in geography and in maps since the outbreak of war, yet the public generally fails to realise the effect of even minor orographical features upon the course of campaigns. He notes further that very many of the maps issued to illustrate the war entirely fail to show the form of the ground, and are thus of little use in following events and appreciating the reasons for the movements of troops. For



Sketch-map to illustrate the battle of the Marne.

example, a small stream with high banks may be a much greater obstacle to the passage of troops than a wide river with low banks and shallow fords. To illustrate the importance of surface features he considers in some detail the movements which led up to the German retreat after the battle of the Marne, which, as he justly observes, is always stated to have been the result of a brilliant stroke on the part of the French commander-in-chief, though few of those who thus describe it could indicate exactly where the skill was shown.

In the first place, Commandant Litre quotes with approval a *mot* of General Boum's, who said that the whole art of war consisted in breaking the enemy's line and then enveloping the separated portion. Thus, in the particular case, it is necessary to ascertain how the successful breaking of the line was accomplished.

After the battle of Charleroi the Germans, by the aid of their superior forces, pressed the Allies steadily backward, and Von Kluck endeavoured to envelop the British troops, which formed the left wing of the Allies, advancing for this purpose by Douai, Cambrai and St. Quentin. Under this pressure the whole Allied force swung round, pivoting upon Nancy, and steadily yielding ground to the advancing foe. The way in which it was finally enabled to turn again and face the enemy, and thus obtain the victory of the Marne, may be followed on the accompanying sketch-map. This map shows, in the first place, that the natural line of advance for an enemy coming upon Paris from the north is by the valley of the river Oise, which continues the valley of the Sambre. Along this easy route Von Kluck advanced with great rapidity, reaching Compiègne in the beginning of September. Meantime four other German armies were advancing upon Paris. The most easterly was that coming through Lorraine, which was enclosed, as it were, by the Vosges and the Moselle river: the second advanced between the Meuse and the Moselle: the third between the Meuse and the Argonne; and the fourth, that of Champagne, marched on the west of the Argonne. The natural features named separated the armies into four compartments, but of them the Argonne is strategically the most important, and merits a little consideration.

The forest of Argonne, shown on the sketch-map, is a hilly tract, made of green grits overlying a marly chalk. The length of the chain is over sixty miles, and the maximum width, in the region of Clermont and Sainte Menehould, is under thirteen miles. The eastern slope is steeper than the western, and the region most difficult to traverse is in the south, where clay is most abundant. In earlier days the chain could only be crossed at five defiles, but communications have been considerably improved lately. The most important crossings are, however, the two shown, that near Grandpré in the north, and the Islettes pass, connecting St. Clermont and Sainte Menehould near the centre. Though the obstacle presented by the region may seem somewhat insignificant, it played an exceedingly important part in the battle of the Marne, and it should be noted that, owing to the way in which the enemy was advancing, it presented itself as a longitudinal, not a transverse barrier, *i.e.* he was following its line in his advance. The

sketch-map shows another point—that the valley of the Marne forms the natural line of advance on Paris for an enemy coming from the east.

Having thus stated the main features of the *terrain*, we come next to the military events. Von Kluck at Compiègne and Creil became aware that he was losing touch with the Champagne army on his left, owing to the line of the Oise diverging too much to the west. He therefore executed the turning movement which aroused so much interest at the time, and swung round, avoiding Paris, to link up with the other German troops on the Grand Morin, a movement which M. Litre states was executed with great skill. But he was apparently unaware of the French army in reserve on his own extreme right, and this army followed him in his swing, taking up a very strong position on the river Ourcq. This movement cut off Von Kluck from his detachments at Amiens and Arras, and threatened his communications. At the same time the Duke of Würtemberg, further to the east, found himself cut off, by the insurmountable barrier of the southern Argonne, from the army corps advancing by the Meuse valley, and from the army of Lorraine. The result was to isolate a section of the enemy forces, but the necessary break in the line was accomplished, not by a direct attack, but by the position of the enemy troops at the moment in relation to the Argonne heights. The section of the enemy forces thus enclosed between the French troops on the Ourcq and the British troops further south on the one hand, and the Argonne barrier on the other, was outnumbered by the attacking force, and could not obtain reinforcements in time from the eastern section. The one hole in the trap, apart from the northern one, was, as the map shows, along the valley of the Marne, and thus the steadfastness of the French troops who held Vitry-le-François was essential to the success of the manœuvre: they held firm, however, and the French armies at Montmirail and at Sézanne and Fère-Champenoise defeated the German armies opposed to them, and flung them beyond the Petit Morin and the marshes of St. Gond. A direct retreat to the north-east was impossible to the Duke of Würtemberg on account of the Argonne at his back, and he was obliged to retreat northward to the vicinity of the defile of Grandpré, through which his supplies were coming, at the same time keeping within reach of the Islettes ravine, by which he was in connection with the Meuse Valley force. The first corps of this force had before the battle already reached Revigny on the Ornain, but, to the great astonishment of the public, says M. Litre, retreated to Varrennes without ever having come into action. This movement also, however, was necessitated by the nature of the Argonne massif, for the troops could not risk being driven up against its difficult southern slopes.

Von Kluck's troops, it will be remembered, retreated to the neighbourhood of Soissons, the Duke of Würtemberg established himself to the north of Sainte Menehould, and thus the line of the Aisne was formed, the German centre being obliged to abandon the attempt to hold the rich country round Rheims. Applying General Boum's formula

to the whole battle, it is clear that it was the orographical accident of the Argonne which broke the German line at the critical moment, while the Paris army and the British troops carried out the enveloping movement, and the French centre and the right held fast. But it was the genius of the French commander-in-chief which enabled him to appreciate the possibilities of the situation at the critical moment. Though M. Litre does not mention the point, it is obvious that the description just given affords a reason for the marked rally of the enemy troops after their first hasty retreat. As it was an orographical feature that was breaking their line, a retreat to a point where this ceased to exert an effect enabled the separated armies to gain touch once more, and thus to bring their numbers to bear upon their adversaries.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Lectures in January.

On the 27th of January, in Edinburgh, Dr. Vaughan Cornish, F.G.S., F.C.S., F.R.G.S., will deliver a lecture on "The Strategic Geography of the British Empire." The lecture will be repeated the following evening (28th inst.) in Glasgow.

GEOGRAPHICAL NOTES.

Asia.

Sir Aurel Stein's Expedition.—According to a note in the *Geographical Journal* for December, a further letter has been received by the Royal Geographical Society from Sir Aurel Stein, dated Oct. 27, 1915, from Bokhara. Since his previous communication (cf. vol. xxxi. p. 598) he had carried out his intended exploration of the Pamirs, having "done three months' almost continual travelling through the Alai region, across the Russian Pamirs, and then down the whole length of the Oxus through Wakhan, Shughnan, Roshan, and the other Alpine tracts along its right bank." The journey proved both interesting and profitable, and yielded many important observations. At the time of writing Sir Aurel Stein was on his way to Meshed. Owing to the fact that he had received all possible assistance from the Russian political authorities during his journey across the Pamirs and then westwards, he had been able to cover more ground than was contemplated in his original programme, in spite of the serious obstacles presented by high glacier passes, and the difficult narrow gorges of Shughnan, Roshan, etc. The explorer, as already stated here, proposes to devote the winter to work in Seistan.

A later communication reports Sir Aurel Stein's arrival at Meshed. He is expected home in May.

Africa.

The Sahara in 1915.—Mr. Frank R. Cana contributes to the *Geographical Journal* for November a paper of a type which might well be more frequently represented in geographical periodicals than it is. The paper in question contains a comprehensive summary of the physical, political, and economic geography of the Sahara at the present time, with a discussion of probable future lines of development.

Mr. Cana begins by pointing out that the common notion that the Sahara consists chiefly of wastes of sand is not borne out by recent investigation, and is due to the fact that sand predominates to the north, west and east, the directions in which the region has been most frequently approached, but not in the centre, in which rocky plateaux are far more frequent. The size of the whole area is not greatly inferior to that of Europe, being some 3,500,000 square miles, and sand-dunes probably cover only some 700,000 square miles of its surface. As a whole the Sahara is best described as a great tableland scored by the beds of dried-up rivers, diversified by mountains and depressions, and fringed by a wide belt of sand on the north, east and west. Southward there is generally an intermediate belt between the desert and the lands of the Sudan. The higher plateaux and mountain ranges occupy the centre of the whole area, the main elevated mass being an approximately square mass of mountains and plateaux, lying immediately south of Algeria and Tunis. Of the mountains the most interesting are the Ahaggar or Hoggar group, which cover an area as great as do the Alps, but do not rise much over 8000 feet in their highest points. In this central region there is but little sand, but the country is nevertheless exceedingly forbidding and lifeless, although the mountains have wooded hollows and pasture lands.

The whole population of the Sahara is exceedingly small. If the Fayum be excluded, and also the city of Tripoli, the total is under 2,000,000, of which nearly one-fourth is found in the Algerian Sahara. The majority of the people are of Berber origin, and, wherever possible, are tillers of the ground, and thus differ from the Arabs. Though the majority are nomads, yet they are dependent on the towns for their markets and thus for their existence, and these towns, which vary in population from 2000 to (rarely) 10,000, are either agricultural settlements in the oases, or are on the routes from the Mediterranean to the Sudan; often the same town fulfils both conditions. The chief commodities of the Sahara are the products of the date palm, the camel and salt, and the Berber tribes, as well as cultivating the soil where they can, have a few primitive manufactures, such as the weaving of woollen garments and the making of carpets. A profitable occupation, which has diminished under European influence, was the convoying of caravans across the desert from the Sudan to the Mediterranean. Among the most profitable of the commodities so carried were slaves, and the slave trade has been put down by the European powers. In addition, the development of French and British colonies on the west coast has tended to divert the traffic which used to pass across the desert to the coast, and thus further helped to

depress the economic condition of the nomads. Mr. Cana believes that the trans-Saharan trade has probably gone for good, but he thinks that it may be possible to develop a new form of trade between the Mediterranean seaboard and the desert in supplying the wants of the people of the interior in cotton goods, tea, and sugar. Among the desert products he believes that dates will become increasingly important. France is making great efforts to further their cultivation in the Algerian Sahara, and her efforts have already met with a measure of success. Thus the sinking of many wells has greatly increased the productivity of the Rhir oasis, and the opening of the line from Biskra to Tuggart in May 1914 has given the cultivators the chance of putting these on the market of Europe. It was expected that the 1915 crop would reach a value of some £160,000, and it is estimated that the Rhir region could produce for export £500,000 worth of dates per annum. Other fruits, such as peaches, grapes, oranges, figs, apples, etc., can also be produced for export, as well as grain crops for local use, and the sale of the fruit crops should lead to a demand for European goods. In various parts of the desert also stock-raising can be carried on, as well as ostrich farming. It is possible that about one-tenth of the whole area, say 350,000 square miles, may prove capable of cultivation, and support a population ten times as large as that at present. But even so, by far the larger part of the whole is apparently destined to remain permanently useless, though areas incapable of cultivation may prove rich in minerals.

Australasia.

Germany and the South Seas.—Professor Karl Sapper contributes to the *Geographische Zeitschrift* for November 19 an article on the German possessions in the South Seas whose loss, in the early part of the war, aroused, he says, the liveliest feelings of regret in Germany. The possessions, it will be remembered, fall into two groups, very dissimilar in size, the German New Guinea group, comprising not only German New Guinea proper (cf. vol. xxx. p. 643), but many island groups, belonging both to Micronesia and Melanesia, and German Samoa. From the economic standpoint, Professor Sapper states, the worth of the possessions is not very great, the chief products being copra and phosphates, and owing to the distance from the motherland German trade with them is insignificant, nor are the possessions such as to permit of extensive German settlement. Further, he states that Germany has not yet been able to imprint her own characteristics deeply on the regions. German is little understood, and the natives in the Melanesian possessions generally speak "pidgin" English, and, "so far as speech goes—and this in spite of recent efforts both on the part of the administration and of settlers of German sympathies—the region has almost an English character." Even in Samoa English is so widespread that the local newspaper appears both in German and in English. "And although the German element strongly predominates among the planters, the preponderance is not sufficiently great to give the European planters' community a purely German aspect." In spite of the efforts

of the administration also, German coins are not the only ones current, and in Melanesia the prohibition of other kinds of money has had unfortunate effects on local trade. Generally, Professor Sapper states, in a curious phrase, that if Germany were deprived of her South Sea colonies, "we must fear that the outer traces of our somewhat short domination there would be relatively quickly wiped out." So far as German feeling goes, however, he gives it as his opinion that the loss of German Samoa would be more severely felt than that of the larger New Guinea possessions. Samoa he regards further as of great strategic importance, especially if Germany, as he hopes, is to be again firmly established in the southern seas. New Guinea, apart from possible agricultural developments, has much commercial and political value, especially as a stage upon the road to Samoa. To retake and to hold the South Sea possessions Germany would require, according to Professor Sapper, a powerful fleet, and strong posts in the colonies themselves, for which great outlay would be necessary. From the point of view of their agricultural resources the loss of the South Sea colonies could be compensated for by a stronger concentration upon Africa, but politically it would mean that Germany would have to renounce all hope of playing an important part in the greatest ocean of the world. "But if we conquer, of which we are all firmly confident, that will not happen. Rather will we after the war create a firm base for our fleet and our trade in the South Seas. Then we shall actively promote agricultural development there, improve our boundaries, and impress both upon the islands and their inhabitants the stamp of the German spirit, so that a new German land may arise on the other side of the globe."

General.

Food Production by Different Systems of Farming.—Mr. T. H. Middleton, Permanent Under-Secretary of the Board of Agriculture and Fisheries, contributed to a discussion on British agriculture as affected by the war, at the Manchester meeting of the British Association, an interesting comparison of the efficiency, from the point of view of food production, of the different methods of land utilisation practised in this country. His paper, though primarily of technical interest, has considerable geographical bearing, for there can be no doubt that much of the present food-supply of the civilised world is produced by methods which can only be maintained so long as fertile land is abundant in proportion to the world population. It would be an interesting, if laborious, piece of geographical research to apply Mr. Middleton's method, say to farming in the United States or Canada, in order to show the amount of land required per head to feed the population there.

The points of special interest in the paper depend upon the following calculations. When land is put down to grazing exclusively it yields at best not more than sixty-seven days' supply of protein per acre, or 140 days' total supply of energy for a man, and at its worst no more than eleven days' supply of each. In other words, in an area where all the land is grazing land, $2\frac{1}{2}$ to 33 acres per head would be required for

the production of food. Where the land is devoted to dairy farming, and the grass is of good quality, 296 days' supply of protein, or 193 of total energy supply, could be obtained per acre, while arable farming, on good land producing food crops and meat, would give 207 days' supply of protein, or 296 total energy supply. Where grass land is attached to the arable land, and all the feeding materials are converted into milk, the energy value of the arable farm is increased to 367 days' food-supply, and the protein yield to 383 days' supply. In other words, with mixed farming and a combination of arable land and good pastures, one acre yields enough food for one man throughout a year. This type of farming is characteristic of long-settled lands and countries rather than of new ones, and the calculation therefore serves as a useful corrective for the over-emphasis sometimes laid in geography books upon the productiveness of the new lands. Such new lands tend to be productive relatively to the amount of labour absorbed in working them, but not to their acreage, or, in other words, their man-yield is high and their acre-yield low. As the world becomes more densely peopled there can be no doubt that the utilisation of large areas of land for grazing purposes will become impossible, for such lands will require to yield more than they can do under such circumstances. Thus meat and animal products must tend to rise in price as population becomes more dense.

The Evolution of Herbaceous Plants.—In an article with this title, Messrs. E. W. Sinnott and I. W. Bailey discuss in the *Journal of Geology*, May-June 1915, questions which, although at first sight they may seem to be purely matters of technical botany, have yet important geographical bearings. These are the periods when herbaceous plants originated on the globe, and the reason for the fact that they are more numerous in the northern temperate zone than elsewhere. For reasons which we need not consider here, for they belong to pure botany, the authors come to the conclusion that herbs are of geologically recent origin, having arisen by modification from woody plants. The cause of this process of evolution they regard as the gradual cooling of the climate since the beginning of the Tertiary period, with the consequent appearance of a severe winter season. Herbs are better fitted than trees or shrubs to survive low winter temperatures, because at the onset of the winter cold they die back to the ground, and pass the winter either in the forms of underground parts as tubers, bulbs, and so forth, or, in the case of annuals, as seeds. While the authors believe that the evolution of herbaceous plants was proceeding throughout the Tertiary period, they ascribe the present predominance of herbs in the north temperate zone, and especially in Europe, to the influence of the glacial period, which led to the extermination of a greater proportion of trees and shrubs than of herbs. The paucity of woody dicotyledons in Europe as compared with America is probably due to the fact that many trees were saved in the latter country by a southward migration during the maximum glaciation, and a reverse movement as conditions improved. In Europe, on the other hand, owing to the presence of the Mediterranean

Sea, and of the great deserts, such a migration was not possible to the same extent. On the other hand, the fact that herbs are scantily represented in tropical regions is explained by the absence of winter conditions there, which made the particular adaptation shown by the herb unnecessary. Most of the not very numerous herbs of the tropics and of the south temperate zone the authors believe to be of northern origin. They hold that there is evidence to show that in the Antarctic area refrigeration took place with such extreme rapidity as to render the gradual evolution of many herbaceous plants impossible, while the southward narrowing of the land masses in the southern hemisphere, with the exception of Australia, gave less space within which the evolutionary process could take place.

The authors make no allusion to the geographical bearings of the facts they discuss, but it seems worth while to indicate some of these. It is a familiar fact that the plants which man cultivates most widely tend to be herbaceous in type, and it has also been noted by geographers that the greater abundance of herbs in the north temperate zone than elsewhere, and especially the multitude of annual plants there, is one of the reasons why that zone is better fitted to human activity than the south, and therefore is one reason why civilisation arose in the northern hemisphere. Man's preference for herbs as cultivated plants is explained by their rapidity of growth and reproduction, and especially by the rate at which they produce quantities of seeds, many of which are used as human food. It has often been noticed that the slow growth of trees is one reason why most races show considerable reluctance to plant these, and where their fruits or seeds are to be used as food they can only be cultivated by the capitalist, who can afford to wait for his crop. Further, the rapid way in which most herbs run through their life-history makes variation, whether occurring naturally or under human guidance, speedy. If the authors of the present paper are right in their belief that it was the gradual cooling of the climate in Tertiary times, a cooling which culminated in the glacial period, which was the determining cause of the origin of herbs, then we have one more reason for believing that it was the nature and extent of its glaciation which rendered the northern hemisphere especially suited to be the home of civilised man. It has often been suggested that the effects of that period on drainage, on soils, and so forth are important in this connection, and thus the additional argument furnished by the paper is of special interest.

Commercial Geography.

Exports of United States in 1914-15.—In *Commercial America* there appear some statistics in regard to the foreign commerce of the United States in 1914-15 which are of much interest, though one must of course beware of regarding them as yet as more than an illustration of the disturbance of world commerce owing to the war. In the year ending June 30, 1915, *i.e.* the first war year, the total exports of the U.S.A. for the first time exceeded those of the United Kingdom. The total was $2,768,600,000, made up of domestic products $2,716,200,000

and foreign products $52,400,000, the figures for the previous year being $2,329,700,000 and $34,900,000 respectively. The exports of the United Kingdom for the same period showed a decrease of 30 per cent. as compared with the previous year, while those of the United States showed an increase of 17 per cent.

The Sea Route between Siberia and Europe.—A note in the *Revue Générale des Sciences* emphasises the importance of finding a maritime outlet for the produce of Siberia, especially under existing conditions, for the Siberian railway is stated to be at present reserved exclusively for the transport of war material. It is estimated that in consequence some 150 million poods (one pood = 36 lbs.) of wheat are held up in the interior of Siberia, and enormous quantities of butter, hemp, flax, linseed, and other raw material have had to be warehoused at great expense in default of an outlet. At the same time there is hope that it may prove easier to establish a sea route than was feared. The Siberian Steamship Company has had a successful season, two of its ships having brought to this country, from the banks of the Obi and Yenesei, cargoes of goods valued at £360,000. Further, the voyage between Tromsoe, the last European port touched at, and the mouth of the Obi has been reduced in time to nineteen days. The Russian Government has facilitated the voyage by the establishment of three wireless stations, two of which command the strait giving entrance to the Kara Sea, and are able to give information to approaching vessels in regard to the state of the ice and the best channels. Again, an important result of this year's voyages has been to show that the mouth of the Obi has greater navigability than was thought. Hitherto, owing to the shallow waters of the estuary, direct transhipment between the sea-going vessels and the river fleet has not been attempted, but it is now found that it is possible for a ship of 3100 tons to navigate the mouth of the river, and take up there a complete load. The Obi river fleet consists of 350 ships and 650 barges, whose capacity rises to 3000 tons, and this fleet is capable of transporting to the river mouth 500,000 tons of merchandise per annum. On the Yenesei the river fleet only consists of some forty ships, which are capable of loading some two to three sea-going ships, but further developments are hoped for. It is proposed next year to send some thirty ships from Europe to the mouth of the Siberian rivers.

EDUCATIONAL.

Oxford School of Geography.—The Committee for Geography's report for the period 1914-15 contains the following reference to the late Professor Herbertson:—

"The Committee has to record with deep and sincere regret the death of Professor Herbertson during the Long Vacation, on July 31. For the last ten years he has been Director of the School, Reader in Geography since 1905, Reader and Professor since 1910. In him the

School has lost a devoted head, who even during his last illness continued indefatigably to forward its interests and those of Geography in the University by all the means in his power. To replace him will not be easy.

"During the period for which Mr. Herbertson was in charge of it, the School has made steady progress, marked notably by the increasing number of regular students who have worked for the University Diploma and Certificates in Geography, and the grant by the University of research degrees for definitely geographical work. Between 1905 and 1915 Diplomas have been granted to 68 persons (to 20 with distinction), Certificates in General and Regional Geography to 68 (to 7 with distinction), and Certificates in Surveying to 3 (to 1 with distinction). Of these successful candidates, 39 were members of the University, graduate or undergraduate. The degree of B.Sc. was granted to 3 men, that of B.Litt. to one.

"The professorship was a personal distinction granted to Mr. Herbertson; but he succeeded, while he was Reader, in starting the collection of funds for the establishment of a regular Chair which, it is much to be hoped, will continue to grow: the total sum yet secured is only a small fraction of what is needed.

"During the same period the large increase in the collections of maps, books, and other apparatus belonging to the School, and the considerable increase in the number of regular students, which had previously begun to render the rooms at the Old Ashmolean very cramped, altogether overflowed the narrow accommodation there afforded. It was largely through Professor Herbertson's efforts that the tension was happily relieved by the successful expedient of renting Acland House in Broad Street, almost opposite the Old Ashmolean. Here the collections and a larger teaching staff can be conveniently housed, at any rate for some years to come, and a foundation has been laid for an Institute of Imperial Geography and History such as formed one of Professor Herbertson's most cherished ambitions. Without this improved accommodation, it may be added, the now very well attended biennial Vacation Courses, with which his name was so generally and closely associated, could not have been held without great difficulty and additional expense.

"Professor Herbertson's family have proposed since his death to present to the School the considerable number of books which he had at different times lent to the library.

"The problem of the conduct of the School in the emergency created by the Professor's death was solved for the moment, in September, by nominating as Acting Director Mr. H. O. Beckit, Balliol College, who has been Assistant to the Reader since 1908; and special arrangements were made for some of the courses to be given next year."

The report also shows that while, owing to the war, there has necessarily been a reduction in the numbers of men reading at the School, there has been less reduction in the amount of teaching demanded than in most other University departments, the number of women students being considerable.

NEW BOOKS.

EUROPE.

Lowland Scotch as spoken in the Lower Strathearn District of Perthshire. By Sir James Wilson. London: Humfrey Milford, 1915. *Price 5s. net.*

This book contains the results of a careful and prolonged study of the dialect used in the valley of the Earn, especially in the parish of Dunning, words and pronunciation being taken down from the lips of the village people, chiefly the older folks. His investigations have led the author to the conclusion that the dialect is pure English, with very little admixture of other tongues, even of Gaelic, and is in the main a direct descendant of the language spoken by the first Angle invaders who settled in the valley of the Earn. With the Scotch dialect discussed is contrasted throughout what the author describes as "standard English," the speech which the people have been taught in school to read and speak, and with which they are familiar in books and newspapers. Our only criticism here is that this "standard English" seems to be an emasculated tongue, from which every racy idiom or provincial word has been eliminated, which comes perilously near journalese, and has never been a spoken language except perhaps on the lips of schoolmasters. But even with this caveat, that a good deal of "Strathearn Scotch" is still "Standard English" through much of Scotland and England alike, one cannot but be struck with the rich store of words, idioms and forms of proverbs and sayings which the dialect studied contains. Many of the phrases bring up admirably vivid pictures of life in this Highland Border tract, and all lovers of Scotland and all those able to appreciate the savour of a local dialect will be grateful to Sir James Wilson for his conscientious labours.

Switzerland in Winter (Discursive Information for Visitors). By Will. and Carine Cadby. London: Mills and Boon, Limited, 1915. *Price 5s. net.*

This book dates so definitely from before the war that the middle ages may seem scarcely more remote than the life which it describes. It belongs to the far-off time when leisured persons talked, during the winter months, of Switzerland, and snow, and skis, and not of campaigns, strategy, and casualty lists. When the old days return, the devotee of winter sport will find here full details in regard to the various resorts, advice as to clothing and the vexed question of tipping, notes on health and on sport, especially on ski-ing, and on many other connected matters. Of geography there is necessarily very little, but the numerous photos give an excellent idea of the appearance of the Alps and the Alpine resorts under winter conditions.

The Famous Cities of Ireland. By Stephen Gwynn. Dublin and London: Maunsel and Co., 1915. *Price 5s. net.*

In this volume Mr. Gwynn uses the word "city" very broadly, for Maynooth is included in the eleven "cities" described. Each town serves as the background for a most interesting account of the episodes of Irish history connected with it. Thus we find in the volume more of historical interest than of purely geographical value. Nevertheless geographical conditions have not been overlooked, and in the accounts of *e.g.* Galway, Cork and Belfast, there is useful material for the geographer. The question of cattle export is also referred to (p. 45). Consideration of Belfast is left to the end of the book, where the future of Ulster is discussed (pp.

335-341). Mr. Gwynn's conclusion is that the Irish parliament will lack "men of large commercial experience; and Belfast is the only place to get them." Thus "what should most concern all Ulstermen and all Irishmen is the future of Belfast —for with it is inextricably bound up, for good or for evil, the whole future of the Irish nation." The style of the volume throughout is vigorous, and the reader is carried from town to town with no feeling of fatigue. Mr. Thomson's illustrations are excellent; we think the sketch entitled "The Triumph of Mind over Matter" (p. 45) a specially happy effort. By lovers of Ireland, with its rich stores of legendary lore, political intrigue, and historical pathos, the volume will be deservedly welcomed.

ASIA.

A Short History of the Sikhs. By C. H. Payne, M.A. London: T. Nelson and Sons, 1915. *Price* 2*s. net.*

This compact little book gives a concise account of the Sikh people. Written by one who has had ample opportunity of studying the problems of India, the history supplies a want, for there are few recent works on its subject. Readable and clear, and supplied with fourteen illustrations and four maps, it ought, in view of India's place in the story of our Empire and more especially in the present war), to find a ready sale among those interested. The bibliography given as Appendix G is valuable.

My Japanese Year. By T. H. Sanders. London: Mills and Boon, 1915. *Price* 10*s.* 6*d. net.*

The author of this book has been for three years instructor in the Higher Commercial School at Yamagouchi, a small town near the south-west corner of the main island, which still retains many features of old Japan. His book gives a simple and unaffected account of his experiences and observations, illustrated by some fine photographs. No profound study of the people or the country is attempted, and, as a Japanese colleague of the author remarks in a candid preface, some of the remarks made will seem superficial and rather misleading. Taken for what it is, however, an account of Japanese rural life as it strikes the unsophisticated stranger, the book is good reading, and the author has a considerable vein of humour. He has a great objection to Japanese food, which he finds unpalatable, indigestible, and unsatisfying. The soy, so frequently used as a condiment, is distasteful to him, and the rice never seemed sufficiently cooked. We are afraid, however, that Mr. Sanders is mistaken in thinking that "the latest scientific discovery is that a long-continued diet of hulled rice is the cause of sleeping-sickness"; the complaint in question is beri-beri.

AFRICA.

Woman's Mysteries of a Primitive People: The Ibibios of Southern Nigeria. By D. Amaury Talbot. With 44 Illustrations from Photographs. London: Cassell and Co., Ltd., 1915. *Price* 10*s.* 6*d. net.*

Male anthropologists have acknowledged the impossibility of their penetrating the secrets of female mysteries, and it is Mrs. Talbot's main contention that there is an immense field of woman's mysteries from which men must ever remain hopelessly barred. This book records a spirited and valuable effort to break the taboo.

Mrs. Talbot's husband being a commissioner in Southern Nigeria, she has had special opportunities for study, and has selected the tribe of Ibibios for the purpose.

Her book is well-instructed and sympathetic, and she merits warm congratulations on the success of her investigations, concerning the difficulties of which she says but little. The religion, customs, and superstitions of the natives appear to us a strange medley of cruelty and insight, and incidentally provide many perplexing problems for the commissioner to solve. The strange beliefs regarding twins and women who have died in childbirth may be instanced. There are also the mysteries of the fatting-house, of the Juju, of bush souls, of reincarnation, and other traditions of hoar antiquity. Indeed it is suggested that from the Ibibios some of the magic lore of ancient Egypt may have been derived. The native tales are of great interest.

Mrs. Talbot notes the gratitude sometimes shown by the Ibibios, and parenthetically remarks that time after time attempts made on the life of her husband in revenge for the discovery and punishment of evil practices were frustrated by warnings given by some whose hard lot he had made an effort to soften. Mrs. Talbot's work throughout is on a high level, and the volume is well illustrated.

A Woman in the Sahara. By Helen C. Gordon. London: William Heinemann, 1915. *Price 6s. net.*

Though not strictly speaking a book of travel, this volume gives some description of life in Southern Algeria. Miss Gordon writes her impressions in diary form, and if the first part of the book suffers from an attempt to heighten local colour by the frequent use of Arab words, the fault disappears in the latter part, with the result that this portion of the volume is much more enjoyable. In the first part the tale of "Hafsa" (where the use of Arab words begins to disappear) is excellently told; the second part—"In the M'Zab"—is perhaps most geographical; the third and fourth parts contain many well-told incidents of which we may mention "Essence of Roses" and "The Enchanted Palace of Hajd Ahmed." Naturally Miss Gordon has much to say of the position of women in the parts she visited, and chapter xv. deals with this question in some detail. The well-varied contents of this pleasing volume serve to mark the transitional period of Algerian life, for the railway and the motor are fast opening up the edge of the Sahara. The seventeen plates are well chosen to illustrate the subject matter, and there is a short bibliography of authorities consulted.

South-West Africa (formerly German South-West Africa). By William Eveleigh. London: T. Fisher Unwin. *Price 5s. net.*

The literature dealing with South-West Africa is limited, while recent events in that part of the world have rendered the few books which are published in English rather out of date; so the above, which the author describes as "a brief but comprehensive account of the country, its history, its people, its resources, and its great possibilities," is peculiarly welcome at present. Mr. Eveleigh instances Viscount Bryce's "impressions," published in 1895, after a visit to South Africa, in which the latter describes South-West Africa as "a very dreary and desolate region, which seems likely to prove of little value." How far this dictum of Lord Bryce's is from proving correct, in the light of more recent developments, is shown in Mr. Eveleigh's book, which sets forth, in a handy and readable form, a great deal of information about the new South African Colony.

British South-West Africa comprises Ovamboland in the north, Damaraland in the centre, Great Namaqualand in the south, and a portion in the north-east corner called the Caprivizipvel; the total area being about 320,000 square miles. Mr. Eveleigh recalls how, in 1868, during the wars between the Hereros and the Hottentots, the Rhenish Missionary Society appealed to the British Government

for intervention, and begged that "the whole of Hereroland should be declared British territory, under British protection." This appeal, Mr. Eveleigh says, was backed up by Prince (then Count) Bismarck; but our Secretary of State for the Colonies was "unable to adopt the German views on the subject." Surely we have here one of the ironies of history! The appeal for annexation was backed up by Sir Bartle Frere, then Governor of the Cape, but all that the Home Government would agree to was the acquisition of Walvis (Walfisch) Bay and the adjacent territory. It was in 1883 that Germany, by a treaty with a native chief, obtained the cession of Angra Pequena and some 200 miles of land around the bay of that name, thus establishing her first footing on African soil. In the following year the German flag was hoisted at Angra Pequena, and a German protectorate formally proclaimed. With regard to this important and wide-reaching development on the part of Germany Mr. Eveleigh writes:—

"Unfortunately, Great Britain had persistently neglected all opportunites to place the matter beyond reasonable doubt, so there was nothing left for her but to acquiesce in the German expansion with the best grace possible, and a reluctant recognition was given to the German claims, although European colonial opinion in South Africa recognised the action of Germany as nothing less than an unnecessary and unwelcome intrusion."

German designs very soon turned towards Damaraland, and Mr. W. C. Palgrave was sent to Walvis Bay in 1884 to protect colonial interests. It was then that the Herero chief handed to the Commissioner a deed ceding the whole of Damaraland to Great Britain. But the British Government declined the offer, and stated that it would have no objection to the extension of a German protectorate "inland as far as the 20th degree of east longitude," *i.e.* the whole of Damaraland. Was not Germany, says Mr. Eveleigh, "a friendly power"! Accordingly, in 1885, she seized the country.

"These developments were viewed with considerable pride in Germany, for the early period of colonisation was characterised by immense national enthusiasm. The perfervid Pan-Germanists and the sword-rattling Chauvinists fanned the flame, and for a time the whole nation was colony-mad. No consideration whatever was paid to the fact that the newly acquired possessions in South-West Africa had long been widely recognised as British commercial dependencies. Small wonder that the startled colonists in South Africa rubbed their eyes in amazement at the displays of German high politics."

In 1903 the Hereros rose in revolt, and, in the following year, the German general Von Trotha began his campaign of extermination. It is well known how the Hereros were shot down and driven into the deserts to perish by thirst. There is no doubt, says Mr. Eveleigh, that the main causes of the native risings were the bureaucratic methods of the colonial administration and the behaviour of the white traders. "Germany has nothing to learn from England," said the colonial party's official organ in Africa, "or any other colonising nation, having a method of handling social problems peculiar to the German spirit." Mr. Eveleigh refers to an address delivered by Professor Bonn, of Munich University, before the Royal Colonial Institute, early in 1914, wherein he admitted the wrong-doing of Germany towards the unfortunate Hereros.

To look at the other side of the question, Mr. Eveleigh frankly admits that much has been done in the way of developing the resources of the country, and that "many solid achievements stand to the credit of Germany." "A good railway from Walvis Bay to Swakopmund will go far to solve the problem of the future of a town which is a good monument to German industry and enterprise." Dealing with the development of the country and its economic future, Mr.

Eveleigh provides sundry interesting statistics of mineral products, etc., and shows that great possibilities also exist in certain parts of the colony both for agriculture and for stock-raising. The value of diamonds exported since 1908 exceeds seven million pounds sterling, and there is an immense store to draw upon. The life of the diamond fields which have been discovered is from fifteen to twenty years, and there are probably many finds yet to be made in that direction.

AMERICA.

The French in the Heart of America. By JOHN FINLEY. New York: Charles Scribner's Sons, 1915. *Price* $2.50 *net.*

This volume, by the Commissioner of Education and President of the University of the State of New York, contains the lectures which the eminent author delivered at the Sorbonne, Paris, and in other cities of France. The task of telling the story of the French exploration in the valley of the St. Lawrence, in the region of the Great Lakes, and in the basin of the Mississippi, has been to Mr. Finley a labour of love. Behind the vivid phrases and the pen pictures there lies the serious and laborious research, and we are often apt to forget this as we are borne along by the fine telling of a wonderful story. The book is truly "an epic of exploration," but it is more than this—it is an accurate historical and geographical account of the French settlements in the United States, and as such must take an honourable place in literature. We are led in a charming way from Labrador to the Lakes, from the Lakes to the Great River, from the Great River to its extensive basin. We read as in a novel of the heroic efforts of French pioneers, priests, and courtiers. The work of giving the whole story within reasonable compass was well worth doing, and it is but faint praise to say that Mr. Finley has done the work well.

North America during the Eighteenth Century. By T. CROCKETT and B. C. WALLIS. Cambridge: University Press, 1915. *Price* 3*s. net.*

This little volume examines the geographical conditions that governed the Seven Years' War and its sequel in America. The barrier of the Appalachian "Backwoods" is first described, its through routes examined, and the French line of forts studied. Relations between campaigns and climate are considered, and the different aims and policies of British and French colonists stated. British expansion westwards was blocked by French forts at Forts Duquesne and Niagara, while the approach by the Hudson River-Lake Champlain route to the St. Lawrence was closed by Fort Ticonderoga, Crown Point, etc. Louisbourg guarded the entrance to the St. Lawrence river. The authors detail the events leading to the strategic and economic checks which the French incurred in the loss of Louisbourg and Fort Duquesne, and point out causes for our lack of success at Ticonderoga. Thus the way was prepared for Pitt's grand combined campaign of 1759 against Quebec, the key to the St. Lawrence. Wolfe sailed up the St. Lawrence where he was to await Amherst who was to open the Lake Champlain route, and Prideaux who after reducing Fort Niagara was to join Amherst at Montreal. The three forces were to attack Quebec, which however fell to Wolfe before the other armies arrived.

The defeat of the French secured the safety of the American colonists who, goaded by English trade restrictions and political blundering, secured their independence in 1783. The geographical reasons for our defeat are carefully set forth by the authors. We congratulate Messrs. Crockett and Wallis on their clear

account of the geographical history of these wars in which geographic control played so large a part. Perhaps a better title for the volume might have been found, and Mr. Wallis's maps would be improved by orientation, but the material is skilfully handled and the argument logically developed. The summaries of the chapters form an excellent précis of the book.

America and her Problems. By Paul H. B. d'Estournelles de Constant. New York: The Macmillan Company, 1915. *Price* 8*s.* 6*d. net.*

The Baron de Constant, apostle of international peace and goodwill, who, in the course of his lecturing tours, has gone over the length and breadth of the United States at various times during the last thirteen years, has given his impressions and observations in this book. As he says in his preface, he has tried to describe the United States as he saw them, with the numerous problems—internal, external, economic, political and moral—that confront them. The book in some ways invites comparison with the work of another distinguished Frenchman, M. Paul Bourget, in his *Outre Mer*. Both authors possess in a marked degree the power of seeing something of the inwardness of things, though M. de Constant never lets his readers forget that his point of view is that of the pacifist. The present is the American edition of his book; it is translated by Mr. George A. Raper, and not the least of its merits consists in the excellence of the translation, though some of the American spellings appear strange to English eyes. The original edition was published in France before the war, but, in the present edition, an attempt has been made by amplifications of the text, and by notes, to bring it up to date. Necessarily, a wide difference exists between Baron de Constant's pacifist theories and the actual course of events in the last twelve months. For example, he advocates a collective co-operation of all the great powers, "American as well as European and Asiatic" to restore order in Mexico, which leads him to his scheme for a "Pan-European Bureau," on the lines of the Pan-American Bureau at Washington, to secure universal peace. Allowance must be made for the author's special standpoint, although, to do him justice, he appears to be whole-heartedly with his own countrymen in their fight against German aggression. But, for him, the present upheaval only serves to confirm the existence of the dangers which he has prophesied, and the correctness of the views which he has so persistently advocated. A visit to Milwaukee, with its large German population, affords a text for reflection on German militarism and the doctrine that might makes right. Part of this chapter is written since the war, and, in an eloquent passage, M. de Constant shows what, in his opinion, the great German people might have become, compared with what they now are under the dominance of the military party.

It is difficult to summarise the contents of the five hundred and odd closely packed pages within the limits of a brief review, but we may make a few quotations as samples:—

"Americans burn the candle at both ends. They are splendid organisers and understand everything except the value of lost time. Continually busy as they are over smoothing out rough places . . . they are unacquainted with the three elements which are indispensable to happiness and success; I mean silence, solitude, and sadness."

Referring to the rumours of war between the United States and Japan which crop up from time to time, Baron de Constant says, "I have more than once compared the talks of war to a soap-bubble. If one wished the bubble could be burst by a cannon shot, but who would wish or would permit that shot to be fired? The possibility of war between Japan and the United States is not conceivable, unless

one is willing to suppose the two governments equally stupid, the two nations equally blind, and the world at large indifferent to their joint absurdity."

He is impressed by the danger of the Federal Capital of Washington being so far away from the Central and Western States of the Union, and by the fact that the whole administration is entrusted, for four years, to one man: "If we carry analysis to its conclusion, we find that the fate of a world is decided by one city and one man! Let us Europeans harbour no delusions in this matter; the risk, though remote, is no less for us than it is for the Americans. Their destiny is as closely bound up with ours as if the Atlantic Ocean had no existence whatever."

To pass from grave to gay, we may quote part of an amusing account of a sitting of the Legislature of the State of Colorado in the Capitol at Denver: "The members of the Legislature take things easily, smoke, and lean back in their chairs with their feet on their desks. Shades of great debates in the British and French parliaments, how dim and far away you seem! The example set by members is followed by the officials, including the 'cheeky' boys employed (to save money) as ushers. Only the girl stenographers and typewriters behave properly and are always ready for any member who wants to dictate a letter. The finest specimen of disregard for appearances was the principal secretary. This excellent man walked about in his shirt-sleeves with a pipe in his mouth."

Baron de Constant takes a very grave view of the Negro question in the United States, and thinks that every day that passes makes the problem more difficult of solution. In this book he takes the world for his province, and, from the United States and Canada, he flies to speculations on the future possibilities of undeveloped South America, Russian Siberia, and Australasia. The book contains much which is suggestive and much which is interesting. If we may say so, perhaps it might be improved by condensation, for the paragraphs into which it is divided suffer from diffuseness. The praises too which the author lavishes on American educational and municipal institutions almost lead one to doubt whether the practice in these matters is quite up to the theory; but his comments and observations will repay careful study, and we cordially recommend the book to the attention of our readers.

Anglo-Canadian Year-Book. By KEITH MORRIS. London: William Stevens, 1915. *Price 5s. net.*

This is a useful annual containing a large amount of material not otherwise very easily obtainable. As giving an idea of the variety of the contents we select the following facts obtained from various sections of the book. The total population of Canada is estimated as having reached 8,000,000 this year. The total native population, consisting of Indians and Eskimos, at a census taken in 1913, was found to be just over 100,000. An interesting table of Indian occupations shows that the original occupation of hunting, trapping, and fishing still attracts the largest number, some 10,000. Farming comes next with nearly 7000, while stock-raising is much less popular (3500). The statistics as to salaries and wages throw some interesting light on social conditions. Thus governesses are but little in demand, and their salaries are about one-fourth of those of trained nurses. Indeed, the salaries of teachers generally are low. Farm labour is said to have increased in amount as the result of the war, a curious fact, and wages have dropped in consequence. The rise in the price of food also diminished the demand for farm help during last winter, owing to the increased cost of board. These notes, taken almost at random, may serve to illustrate the nature of the book, which is a useful addition to the technical literature of Canada.

GENERAL.

Arms and the Map: A Study of Nationalities and Frontiers. By Ian C. Hannah, M.A. London: T. Fisher Unwin, 1915. *Price* 3*s.* 6*d. net.*

The author, who was formerly President of King's College, Nova Scotia, says his object is to "give in a broad and general way the more obvious facts which it is right to know when considering the possible form of the new map" of Europe. He first sketches the history of Germany, and concludes that while "Europe would be incomparably poorer than she is without what Germans have done," in regard to the advancement of knowledge in every form, "Germany is very weak where her Western neighbour is very strong. Germans, as a rule, are disliked by those across their frontiers, especially by the little States."

As for France, she is "emphatically the home of ideas; she has perhaps contributed more to the general civilisation of Europe than any other State." Further, the "French power of making themselves agreeable to all other races, the greatest asset their nation has, marks them at all periods of their history and in every quarter of the world."

With regard to Scotland, the author remarks, "Singularly complete is the solidarity that binds all Scots to-day; the very composite origin of the population is hardly remembered at all. Common love of a beautiful land, common admiration for Burns and Scott, perhaps also common pride in the huge share they take in the government of England, have produced one of the compactest nations in the world. The barrier between Teuton and Celt is broken down as in no other land. Yet there has never been any widespread desire that Scotland should have a local administration of her own, a fact that shows how difficult it may be to postulate the form that nationality may take."

In the chapter on Russia we are told that "where Saxondom breeds men of vigorous action such as Cromwell and Washington, Slavdom produces rather thinkers of Tolstoy or Kropotkin type." Yet the Russian people "stand white-hot as one man when the war is for the Slavic brother."

The chapter on the Balkan States is marred by the reference to "the fortunate election (in 1887) to the throne of Bulgaria of Ferdinand of Saxe-Coburg Gotha." As for Austria-Hungary, it is styled a "weird Dual Monarchy, perhaps the most varied, miscellaneous, and ill-assorted collection of States occupying contiguous territory and ruled by a single sovereign, to be read of in the story of mankind."

Touching on colonial possessions, the author states that "it is remarkable that (despite their comparative insignificance) Germany is more interested in her colonies than any other Power. Their positions are clearly and attractively set out upon large maps of the world in the chief railway stations of the empire." The present war has deprived her of all her colonies except German East Africa.

The book displays wide knowledge, but is written in a rather rambling style. There is an ethnographic map of South-East Europe.

Pedralvarez Cabral (Pedro Alluarez de Gouvea): His Progenitors, His Life, and His Voyage to America and India. By James Roxburgh M'Clymont, M.A. London: Bernard Quaritch, 1914. *Price* 7*s.* 6*d. net.*

This book contains a somewhat full account of the family history of the explorer Pedralvarez Cabral, and of the great expedition associated with his name, together with numerous appendices. Cabral with his fleet sailed from Lisbon on March 9,

1500, with instructions to make for Calicut. The ships were provisioned for two years, and carried woollen stuffs, velvets, satins, damasks, amber, copper, coral, and scarlet dye-stuffs for trade purposes. It is usually believed that they numbered thirteen, but Mr. M'Clymont holds that there were seventeen ships. The fleet sailed first to the Cape Verde islands, and afterwards, in accordance with advice received from Vasco da Gama, set its course south-south-west. Currents carried the vessels to the leeward, and after a month land was seen in about 10° S. lat., showing that the coast of Brazil had been reached. A landing was ultimately effected in what the author believes to have been Bahia dos Todos Santos, and a ship was sent home with some of the products of the new land. From the coast of Brazil the journey was continued, and various disasters were experienced, four ships being sunk in a gale, one finding its way into the Gulf of Aden, and only six of the original number reaching Calicut. Of these six one was lost on the homeward journey, but the other five brought home a sufficient load of spices to pay the expenses of the journey, and yield a profit in addition. The number of ships lost, however, perhaps accounts for the fact that Cabral was apparently never again intrusted with a command. Mr. M'Clymont's book is the result of an interesting piece of research, but the explorer as an individual does not emerge from it with any vividness, and we are left, perhaps unavoidably, in the dark as to his characteristics and capacity for dealing with the numerous contingencies which arose in the course of the journey.

An Historical Atlas of Modern Europe from 1789 *to* 1914. By C. Grant Robertson and J. G. Bartholomew. Oxford: University Press. *Price* 3*s.* 6*d. net.*

This is both an atlas and a history, and the thirty-six plates of excellent maps are supplemented by sixteen closely printed pages of historical text of great use to students and teachers at this crisis.

A study of these pages opens up a wide field for reflection on the mutability of states and nationalities from century to century and even from generation to generation. The only European countries that have not changed their shape politically during the last two centuries are Norway, Spain, and the British Isles, and the only natural physical boundary on the mainland that has provided a permanent political frontier is the chain of the Pyrenees. Neither the Alps, the Carpathians, nor the Balkans, Urals or Caucasus have done so. As for the rivers they hardly count, and indeed the most natural thing is for a State to try to own both banks or none at all, and to struggle for the mouth as the main prize to be won at all costs.

The old kingdom of Poland, whose various partitions are depicted on Plate 27, suffered geographically by having no natural boundaries except the Carpathians on a small part of its south-western frontier, and it is obvious that when and if Poland is ever reconstituted according to the expressed intentions of its principal belligerent owners, the difficulty of adequately defining the marches, especially on the featureless Russian plain, will be considerable. The Russians, it is clear from this map, have from time to time acquired by far the largest slice of that unhappy kingdom, the first part of which, extending northwards from the Dnieper for about 700 miles, was ceded to the Czar in 1667. The three subsequent partitions in 1772, 1793 and 1795 respectively gave Russia the lion's share of the spoil, and if the Czar proposes to restore the original Polish State as it existed prior to 1667 from the Gulf of Riga to Ekaterinoslav and Kherson on the Black Sea, he will certainly astonish mankind.

The storm centre of Austria and the Balkans is well depicted on Plate 18, where the ethnographical provinces are graphically described. From this map several important points become quite clear, and if nationalities are to be primarily considered in the permanent pacification of the region, various important changes must obviously be made in the existing boundaries. It is admittedly a difficult matter to construct a reliable ethnographic map where diverse races are so much mixed, but one thing is certain. The Turks have no ethnographic right to be in Europe at all, as they constitute a very small part of the population of the Balkan peninsula, where an insignificant minority domineers over a vast majority of other races. It is hence evident that if these other races would agree to drop their particular animosities, they might easily combine to drive the hated Turk across the Bosphorus. But the trouble is that there are at least five distinct races to deal with in that quarter, the Greeks, Serbians, Bulgarians, Rumanians and Albanians. Further than this, and putting other considerations aside, and considering the matter from the ethnographic standpoint only, it is evident that the Bulgarians have some right to fight for Macedonia and Monastir, where their race would appear to be predominant, while from Nish westwards to Montenegro, Bosnia, and the Adriatic is the natural territory for the Serbs.

On the same principle Rumania should get not only Transylvania in Hungary but also Bessarabia as far east as the Dneister, which was acquired from the Turks by Russia in 1812. Greece may well claim all the islands of the Ægean and the Anatolian coast at Smyrna, but not any more of Macedonia than she has already acquired. It is, however, not probable that the Balkan statesmen will soon amicably agree to any such scientific allotments. But Russia, as shown on Plates 30 and 32, has been steadily extending southwards and eastwards for a whole century, and might well afford to cede the small strip of Bessarabia in her south-western front to secure the friendship of Rumania.

Although this very interesting atlas mainly relates to Europe and the burning questions of the day, it contains a good map showing the partitions of Africa in 1914, a map that like many others will soon have to be revised. There is also a plate of the Far East before the war and one of the world and its owners at the same date. The atlas is an up-to-date educational work of reference of high importance. At the very moderate price of 3s. 6d. it should at once find its way into the library of all who wish to trace the successive steps in the progress or decline of the European States during the last two centuries, and to master some of the complex political and geographical problems of the day.

EDUCATIONAL.

Cambridge Travel-Books: The North-West and North-East Passages, 1576-1611. Edited by P. F. Alexander, M.A. Cambridge: At the University Press, 1915. *Price 2s. 6d. net.*

We are told in the preface that "the aim of the present series is to illustrate the history of geographical discovery by means of select voyages and travels." In this, the first volume of the series, we find the North-West Passage illustrated in the accounts of Frobisher's first and second voyages, of Davis's first, second, and third voyages, and of Hudson's last voyage. The choice is admirable, and should stimulate further reading. A special feature is the fine series of illustrations and maps. The Travel-Books are welcome, and the teacher who is desirous of awakening the imagination of his pupils will know how to use this volume and its successors.

Stories of Exploration and Discovery. By ARTHUR B. ARCHER, M.A. Cambridge: At the University Press, 1915. *Price* 2*s.* 6*d. net.*

This supplies a most interesting, unified account of the progress of exploration and discovery from the very earliest times to Scott's Antarctic voyage. As an adjunct to the history or the geography lesson the book is equally valuable. The chief difficulty before the author must have been in the matter of selection. Here sound judgment has been shown; hence the little volume admirably serves to present a continuity of effort, a sequence of progress. No pupil, who has read through the account, will come away from his task feeling wearied: he will indeed be led to explore himself among the books mentioned in the excellent "reference and study" list appended to the book.

BOOKS RECEIVED.

In the Wake of the War Canoe. A stirring Record of Forty Years' Successful Labour, Peril, and Adventure amongst the Savage Indian Tribes of the Pacific Coast, and the Piratical Head-hunting Haidas of the Queen Charlotte Islands, B.C. By the Venerable W. H. COLLISON, Archdeacon of Metlakahtla. With an Introduction by the Lord Bishop of Derry. With 24 Illustrations and a Map. Demy 8vo. Pp. 352. *Price* 5*s. net.* London: Seeley, Service and Co., 1915.

Prehistoric Man and His Story. A Sketch of the History of Mankind from the Earliest Times. By Professor G. F. SCOTT ELLIOT, M.A., B.Sc., F.R.S.E., F.L.S., F.R.G.S. With 64 Illustrations and Diagrams. Demy 8vo. Pp. 398. *Price* 7*s.* 6*d. net.* London: Seeley, Service and Co., 1915.

A Naturalist in Madagascar. A Record of Observation, Experiences, and Impressions made during a Period of over Fifty Years' Intimate Association with the Natives, and Study of the Animal and Vegetable Life of the Island. By JAMES SIBREE, F.R.G.S. With 52 Illustrations and 3 Maps Demy 8vo. Pp. 320. *Price* 16*s. net.* London: Seeley, Service and Co., 1915.

The Aspirations of Bulgaria. Translated from the Serbian of BALKANICUS. Small Demy 8vo. Pp. xxvii + 249. *Price* 2*s.* 6*d. net.* London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd., 1915.

Edinburgh. By R. L. STEVENSON. With 12 Illustrations in colour by James Heron. Pott 4to. Pp. 160. *Price* 6*s. net.* London: Seeley, Service and Co., 1915.

The Caliph's Last Heritage: A Short History of the Turkish Empire. By Lt.-Col. Sir MARK SYKES, Bart., M.P. Demy 8vo. Pp. xii + 635. *Price* 20*s. net.* London: Macmillan and Co., Ltd., 1915.

The Northern Bantu. An Account of some Central African Tribes of the Uganda Protectorate. By JOHN ROSCOE, M.A. Demy 8vo. Pp. xii + 305. *Price* 12*s.* 6*d. net.* London: Cambridge University Press, 1915.

Deuxième Expédition Antarctique Française, 1908-1910. Commandée par le Dr. JEAN CHARCOT. *Sciences Naturelles: Documents Scientifiques. Némertiens, Céphalopodes, Brachiopodes*, par J. JOUBIN; *Alcyonaires, Madréporaires*, par CH. GRAVIER; *Hydroïdes*, par ARMAND BILLARD; *Oiseaux Antarctiques*, par L. GAIN. *Sciences Physiques: Documents Scientifiques. Description des Côtes et Banquises: Instructions Nautiques*, par M. BONGRAIN. 2 volumes. Paris: Masson et Cie, 1914. Prix 50 frs. et 18 frs.

Jerusalem. By PIERRE LOTI. Translated from the French by W. P. BAINES. Demy 8vo. Pp. viii + 212. *Price* 7*s.* 6*d. net.* London: T. Werner Laurie, Ltd., 1915.

The Colonisation of Australia (1829-42). *The Wakefield Experiment in Empire Building.* By Richard Charles Mills, D.Sc. With an Introduction by Graham Wallas, M.A. Demy 8vo. Pp. xx + 363. *Price* 10*s.* 6*d. net.* London: Sidgwick and Jackson, Ltd., 1915.

The New Europe. Some Essays in Reconstruction. By Arnold Toynbee. Crown 8vo. Pp. 85. *Price* 1*s.* 6*d. net.* London: J. M. Dent and Sons, Ltd., 1915.

Rambles about the Riviera. By Frances M. Gostling. With 42 Illustrations from photographs. Crown 8vo. Pp. xiv + 326. *Price* 6*s. net.* London: Mills and Boon, Ltd., 1915.

Romany Life, Experienced and Observed during many Years of Friendly Intercourse with the Gypsies. By Frank Cuttriss. Illustrated with a large number of unique photographs and other pictures by the author. Demy 8vo. Pp. xii + 283. *Price* 7*s.* 6*d. net.* London: Mills and Boon, Ltd., 1915.

The Way of Martha and the Way of Mary. By Stephen Graham. Demy 8vo. Pp. xii + 291. *Price* 7*s.* 6*d. net.* London: Macmillan and Co., Ltd., 1915.

The Balkans. A History of Bulgaria, Serbia, Greece, Rumania, and Turkey. By Nevill Forbes, Arnold J. Toynbee, D. Mitrany, and D. G. Hogarth. Crown 8vo. Pp. 407. *Price* 5*s. net.* Oxford: The Clarendon Press, 1915.

Atti del X Congresso Internazionale di Geografia, Roma, 1913. Pp. 1548. *Prezzo Lire* 25. Roma, 1915.

Norske Gaardnavane: Oplysninger Samlede Til Brug Ved Matrikelens Revision. By O. Rygh. 9 vols. Kristiania, 1915.

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The "Daily Telegraph" War Map of the New British Front in contour colouring, No. 13.—By Alex. Gross, F.R.G.S. Price 1s. net ; on cloth, 2s. 6d. net ; varnished and mounted on rollers, 5s. 6d. net. 1915.
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Milano,	.	.	.	,, ,, ,, L. 32
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Warsaw (Varshava),	.	.	.	,, ,, ,, N. 34

Geographical Section, General Staff, London.

Germany has so far contributed nothing to the International Map of the World, but at the present time this country is taking up the work with special energy. Thanks to the valuable co-operation of the staff of the Royal Geographical Society of London most of the Central Europe sheets are now published. The issue is, however, provisional, and, although the contour lines are shown in brown, there is no layer colouring.

AFRICA.

PLAN OF COALFIELD AT ENUGU-NGWO.—Scale 1 : 12,500 or 5 inches to 1 mile. Surveyed by the Topographical Branch of Nigeria Survey.

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AMERICA.

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An excellent large-scale school wall map showing counties and townships effectively printed in colour.

THE DISTRICT OF PANAMA.—By Percy W. Ryde, F.R.G.S. Natural scale 1 : 150,000. Price 7s. 6d. on cloth, rollers and varnished. 1915.

G. W. Bacon and Co., London.

This wall map is admirably designed for illustrating the topography of the Panama Canal. It shows in two maps and two bird's-eye views the country before and after the making of the canal, and the contrast is striking.

ATLASES.

ATLAS OF THE HISTORICAL GEOGRAPHY OF THE HOLY LAND.—Designed and edited by George Adam Smith, D.D., LL.D., Litt.D., and prepared under the direction of J. G. Bartholomew, LL.D., F.R.S.E., Cartographer to the King. 1915. Price 25s. net. *Hodder and Stoughton, London.*

This atlas will be noticed elsewhere in a later issue.

HISTORICAL ATLAS OF MODERN EUROPE FROM 1789 TO 1914.—With an Historical and Explanatory Text by C. Grant Robertson, M.A., C.V.O., and J. G. Bartholomew, LL.D., F.R.G.S. 1915. Price 3s. 6d. net.

Oxford University Press, London.

This atlas is noticed elsewhere (p. 51).

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

THE GEOGRAPHICAL TREATMENT OF RIVERS.[1]

By MARION I. NEWBIGIN, D.Sc. (Lond.).

PERHAPS few geographical questions have been more discussed of recent years than that of the scope of geography, and the best method of delimiting its sphere from those of allied sciences. It is, however, remarkable that these discussions have mostly remained on the theoretical plane, and there have been few, if any, attempts to work out in practice the most truly geographical mode of attacking particular branches of the subject. For example, the treatment of the whole department of physical geography has not only been chaotic in itself, but, further, little effort has been made to discriminate between the domain of the geologist and of the geographer proper within it. Yet, at least theoretically, the spheres of interest of the two should be more or less clearly demarcated.

Let us note first the scope of geology as defined by geologists. In his *Outlines of Geology* Professor James Geikie says in regard to it, "this science might be defined as an inquiry into the history or development of the earth's crust, and of the several floras and faunas which have clothed and peopled its surface." He goes on to say that "dealing, as geology does, with the operations of nature in the past, it is obvious that the student's first aim must be to obtain a clear knowledge of the mode in which nature works at present, before he attempts to interpret the record of the rocks. . . . Attention must be directed, then, at the outset, to a study of those great forces by the action of which the crust of the globe is being continually modified. It is essential that we learn to appreciate the work done by the atmosphere, by frost and snow and ice, by rain and underground water, by rivers and lakes, by the sea, by plants and animals, and by the subterranean forces, before we can expect to

[1] A paper read before the Geographical Association in London, on January 6, 1916.

recognise the different parts which those various agents of change have performed in the past."

The quotations are taken from the introductory section of the book, and the author, with perfect logic, goes on to consider the various agents at present at work on the surface of the globe. The survey of these is directed, as one would expect from the sentences quoted, to the investigation of the activities of the existing agents of change, with a view to the formulation of the probable part which they have played in the past. The curious point, however, is that the treatment in geography books which contain a section on physical geography, or in those devoted to this subject alone, is broadly similar in style, though the geographer's aim is something different. What is his aim? Geography, as you know, may be defined as the science which deals with the surface relief of the earth, and with the influence which this relief exerts upon the distribution of other phenomena, and especially upon the life of man. Now it is surely strange, if, while the geologist is concerned with the history of the earth's crust, and is interested in the present only in so far as it affords a clue to the past, and the geographer deals with surface relief in so far as it affects the distribution of other phenomena at the present time, the same method of inquiry into physical phenomena should yet be equally suitable to both. Do not the facts suggest that the geographers have not yet come to their own, and have not attacked with sufficient boldness the problem of the best treatment, from their special standpoint, of the abundant material which the geologists have accumulated?

If one may take an analogy from two other sciences, we may say that zoology and physiology are related subjects, whose domains overlap, and yet the physiologists and zoologists, owing to their different modes of approach, contrive to divide their *terrain* so that in practice there is but little, if any, overlapping. Cannot the geologists and geographers learn to do the same?

The general problem is not one which can be tackled within the limits of a short paper, but it is proposed here to take one aspect of it, that which deals with running water, and consider whether it is not possible to free ourselves from the geological tradition in regard to it.

The choice of rivers for such a purpose seems to me fully justified, for geologists, and geographers with strong geological sympathies, have of late years brought forward a whole series of exceedingly interesting deductions in regard to the work and the significance of streams, and there is a tendency, both owing to the intrinsic interest of these deductions and to the attractive way in which they can be put, for all this new material to be shot into the geography books, even the school-books, without any careful consideration of the extent to which they bear upon geography, strictly defined. We seem to be approaching a condition when it will be regarded as necessary for every child of school age to be able to draw diagrams illustrating river capture, and before this occurs it seems to me that we should face the question as to the extent to which the fact that a river is consequent, or subsequent, or obsequent, as the case may be, has a bearing on the life of man.

Perhaps, however, it would be better to put the matter more positively, and ask whether it is not possible to discuss rivers from a purely geographical standpoint. The following presentation is intended to be suggestive merely, for the subject is one which could be greatly elaborated.

The first point that I should like to suggest is that in the treatment of rivers—as perhaps in regard to physical conditions generally—the approach of the geologist and geographer ought to be entirely different. For the former the main importance of running water is that it is a potent agent in the modelling of the land. He thus naturally stresses the work done by rivers, treating it, in the familiar phraseology, under the heads of the work of erosion, of transport, and of deposition. But surely for the geographer the initial importance of rivers is that in themselves—as when they are navigable, or in their navigable reaches—or in their valleys, they form natural lines of communication, the most important natural lines of communication on land; secondly, also, more especially because of their work of deposition, they prepare the surface for the use of man.

Directly connected with this difference of outlook is a different estimation of the importance of the various parts of the river. For the geologist the upper parts of the course are most interesting, for there can he see most clearly the work of erosion and transport going on; there also can he observe deposition taking place in its simplest form; there is it easiest to differentiate between the work of the river proper and the other agents which act in combination with it. Generally, indeed, the activities of running water are most obvious, and most easily studied in its swift mountain and valley track—Ruskin's passage on the work of a glacial stream will occur to all as an admirable simple treatment of the matter. To the geographer, on the other hand, the importance of the lower reaches, in the general case, far outweighs that of the upper.

Once again, the geologist, naturally and necessarily, lays great stress on striking examples of river gorges, waterfalls, etc. So strong has been his influence in this respect on physical geography that probably few authors or teachers have discussed river action without mention of the Niagara Falls and the canyons of the Colorado. Now both of these have, of course, geographical significance also, but my point is that they are what I should describe as museum specimens, not everyday material for laboratory and class-room. If I may again take an analogy from another science, I would say that the neck of the giraffe and of the whale are of great zoological interest, but no zoologist would use them in a first study of the mammalian skeleton. Only after the student had acquired a grip of the ordinary conditions, as exemplified in *e.g.* the rabbit, would his attention be directed to exceptional cases. On the other hand, in a discussion on the theory of evolution such extreme cases might be discussed to the neglect of more usual types. The geologist, seeking to interpret the past by means of the present, is deeply interested in exceptional phenomena existing on the globe at the present time, for these afford a measure of the power of the forces acting upon it. Similarly the evolutionist may base the greater part of his argument on

exceptional conditions in animal morphology. The geographer, intent on discussing the ordinary relief in its relation to the distribution of other phenomena, no less than the zoologist in the example given, should stress the normal rather than the abnormal.

I would go further than this and say that since the geographer's object is to study rivers as they are, rather than as representing a moment in a ceaseless flux, he should concentrate upon the long-established conditions shown in their lower reaches, instead of upon those parts of their course where changes are most obvious. There is indeed to my mind much to be said for a geographical treatment of rivers which would start from their mouths, and, reversing the ordinary treatment, consider them upward to their source, in steadily diminishing detail as their importance to man becomes less. This course would have the further advantage that in the case of the great rivers it would, in the most general case, follow the history of exploration, which normally proceeds from the mouth towards the source and not in the reverse direction.

The ordinary mode of treatment, which the physical geographers have kept owing to their geological leanings, not only over-emphasises the relatively unimportant upper reaches, but it tends to neglect, or to discuss summarily, those wide, open valleys in the lower course which are of such great human importance. Further, the question, so supremely important in geography proper, why some rivers have navigable mouths or estuaries, while other estuaries, though making an imposing display upon the map, are blocked by sand-banks or rocky sills, receives generally the most cursory treatment, and this although, since the ordinary map is of little help, it is one upon which the geographical student wants all the guidance he can get.

Let me suggest some of the lines which a geographical treatment of rivers might follow by a brief discussion of the reason why they are important as lines of communication, both as regards man himself and as avenues for trade. Some of the points mentioned may be thought to be obvious and commonplace, but they are at least less frequently discussed in geography books than they ought to be.

We may begin by noting that rivers form the usual line of advance for explorers in unknown regions, and this whether we consider the historic expeditions of earlier days, or those carried out now in the less known parts of the earth's surface, as in the Amazon region, New Guinea, or even in partially unexplored mountain regions such as the Canadian Rockies. Even the Antarctic area offers only an apparent exception, for explorers there follow when they can the line of the great marginal glaciers, which occupy what under different climatic conditions would be river valleys. Further, as already noted, normally the explorer tends to travel upstream, that is from what we have described as geographically the more important stretch up to the less important one.

When the river itself affords a line of advance for any form of boat or raft, the reason for the choice of it as a route is perfectly obvious. The use of the innumerable streams of Eastern Canada by the early

voyageurs, who adopted the Indian's birch-bark canoe, is perhaps the classic instance of a region whose exploration and subsequent early development was rendered possible by the adaptation of a particular craft to the geographical conditions. But the advantages of movement over water, advantages due to the small amount of friction there as compared with land surfaces, and the consequent possibility of dispensing with a prepared track,—except to the extent of removing or circumventing obstacles to navigation—should not prevent us realising that the fact that a river can be used as a waterway is not its sole advantage as a line of advance through unknown country. That it affords also a guide is of value even to the present-day traveller, and must have been far more important in earlier days. We know that it was long before the boldest navigators found courage to launch out into the open sea, far away from familiar landmarks, and the fact that advance by river left always open a possible line of retreat must have been very early appreciated. Indeed any one who has walked or scrambled in a roadless region, of however small an extent, must have learned from practical experience the value of a stream line as satisfying two strong human instincts, the desire for the unknown, and the reluctance to venture too far from the known.

Not only does the river form a natural pathway both for the outward and the homeward journey, it is further a guide which is most useful where it is most needed, that is in the lower part of the course, where trees, minor irregularities of the surface, and so forth tend to obscure the view. Its guiding power similarly diminishes just where it is least needed, on those upper slopes where the traveller has at least the possibility of a wide survey. It is here that the lure of the river tends to give place to the lure of the pass, but this is a point to which we shall return.

Apart from its importance as a definite and clearly marked line on the earth's surface, leading the upstream traveller from the lower to the higher ground, the river has much else to offer to the pioneer. In very marked contrast to the ocean it supplies one great physiological need, that of drinking water, and in the general case its banks are likely to be more or less tree-clad and thus to yield fuel, material for boat-building or repairing, for the construction of shelters, and so forth. Its waters often yield fish : its banks tend to be frequented by birds and mammals which may yield food. Finally it not only forms a link with the starting-point, but gives opportunity for a retreat much swifter than the advance, for the water will itself carry the traveller homeward with but little effort on his part, and thus he is enabled to carry back with him more or less bulky spoil, a fact which renders possible the beginnings of trade.

More than this, except where the whole course is very short, the stream is likely to pass through regions of different relief, products, even climate, and this without any sharp break, but rather by a gradual process of transition. Thus wherever we have human groups established, in the region where they naturally tend to establish themselves, that is along the lower courses of rivers, there we have a tendency for gradual progress upstream to take place. If the group is pastoral, in summer its members will tend to seek the higher pastures near the headwaters of the stream ; the search for game or fish may similarly entice them up-

wards: wood will be exhausted first in the lower reaches and will have to be sought higher up, the water affording an easy mode of transport, and so with any kind of natural forest produce. Exploration, determined in this way either by the spirit of enterprise or by some form of commercial interest, will lead to the discovery of the difference in character of the various regions of the river's course, and will initiate trade. It is only possible to suggest here, in this summary fashion, what has occurred in many parts of the world which have been settled first near the seaboard. The history of the United States, of Canada, of Australia, is full of illustrations in detail of the process.

The mention of the United States and of Australia reminds us of the important effect, in the history of settlement in both regions, of the crossing of the divide upon which the eastern streams take origin, and thus of the opening up to settlement and civilisation of the vast plains beyond. This brings us back to what we have already called the lure of the pass, and it should be noticed that physical geography books in the general case give quite an erroneous idea, geographically speaking, of the nature of a divide. It is not uncommon to find diagrams representing two streams arising one on each side of a house-roof-like structure supposed to represent the central watershed, and the habit of beginning the description of a river at its source tends further to confirm the idea that the ordinary divide is an impassable barrier. I need hardly point out that this idea is entirely disproved by history, and I would suggest that the part played by the divide in the history of exploration is but one more argument in favour of beginning the geographical description of rivers at the mouth, not the source. The divide on which rivers arise is geographically not a beginning, it is not even an end; quite generally it is but a stage on an open line of communication.

Further, I would point out that in the case of the regions most familiar to us, as inhabitants of temperate climates, the house-roof diagram gives a wholly wrong idea of the character of the ordinary divide. Whether one takes the origin of the great European rivers in the Alps and their continuations, or the far smaller rivers of Scotland or Wales, one finds constantly that the river valley as a line of communication leads up, not to a precipitous mountain-side, but to a more or less level area, often swampy, often with standing water, which affords a comparatively easy passage from one river valley to another. The Mont Cenis pass is a very striking example, but that desolate, wind-swept, approximately level plain, reached by the steep climb up from Lanslebourg on the French side, is paralleled, on a very much smaller scale, near the head of many a minor Highland valley in Scotland, and even the lake is often represented there by a pool or swamp. In all such cases the stream which has been followed to near the head of the pass comes towards the traveller from right or left as the case may be, finding its source not on the pass, but on the adjacent slopes. Not infrequently on the actual pass level there is an area of uncertain drainage, so that trickles may pass to the two streams from the same swampy ground. The condition is, of course, the result of past glaciation, though the same effect may be produced by river capture. But

my point at the moment is simply that the river in geography is not as the books would suggest, an *ignis fatuus*. It does not, as one would suppose from the usual type of description, lead the traveller up to the mountain mist and leave him there. In fact, no less than in history, its mode of origin is often such as to entice him onward over the divide into a perhaps fairer land beyond.

In both the cases already mentioned, those of the eastern United States and of eastern Australia, the land beyond *was* richer and fairer, and the direction of the present lines of communication emphasises the fact. In the Highlands of Scotland the land beyond the divide has in the general case but little to offer, a fact which is reflected in the appearance of the passes, often as empty and desolate as ever they were, occasionally with hill paths, sometimes with roads, but very rarely with railways to obscure their natural features. But the point which it is necessary to stress is that there is usually a distinct difference between the lands this side and that side of the divide, a fact which has always tended to stimulate movement across it. Thus, from the geographical piont of view, rivers not only afford a natural line of advance, rendered in the general case an easy line owing to their peculiarities, they further form a route through regions of different characteristics, adapted for trade with one another, and they frequently lead up to a divide which affords a natural means of approaching another region, probably quite different in its products from any of those traversed by the river which has led up to the divide. Geographically these facts seem to me of more importance than those upon which geologists —rightly enough so far as their own purpose is concerned—lay most stress.

But we have hitherto been assuming that a river's chief importance as a natural route into the interior of a land depends upon the possibility of utilising it directly. Such a possibility of course never exists in the case of headwaters, and may be non-existent throughout the course. We have therefore to consider next why even non-navigable rivers usually form natural lines of advance.

We may note in the first place that many of the advantages already noted remain even if the stream cannot itself be used directly. Thus it still forms a guiding line, and the supplies of drinking water, of possible fuel and food, are still there. But these would not suffice were it not that rivers tend to flow in valleys along which a passage can often be forced in the first instance, and which are well fitted for the various forms of tracks which man lays in order to facilitate rapid movement and the transport of heavy goods. Now, in regard to these valleys, no less than in many other respects, the current geological treatment fails to correspond to the demands of the geographer.

We may in the first place repeat that the geologist is concerned with the river as a modelling agent. But in nature the river does not act alone, and the geologist is constrained to make an analysis of the valley-forming agents, distinguishing between the direct work of running water and the other agents which widen the river-formed valley and modify its shape. In his treatment of rivers, therefore, his attention is necessarily directed chiefly to the upper region, where the effect of the

flowing stream in producing a valley trough is most marked, or to arid regions, or to limestone regions, where the action of running water is seen more or less apart from that of the atmospheric agencies. But this analytical treatment fails to meet the needs of the geographer. It matters little to him what are the agents which produce valleys; the essential point is that rivers in their lower courses tend to flow through wide open valleys, separated often by very low divides from similar valleys occupied by adjacent streams. To the geologist the particular part of the course of such rivers just described is of minor interest. For him the river in such cases had done its work, and as it is the work in which he is specially interested, for him the river has lost interest.

Further, owing to the analytic method imposed upon the geologist by his outlook, the broad open U-shaped valleys in which many temperate rivers flow for part of their course fall to be considered under the heading of the work of ice, and not under that of flowing water, and the absence of a discussion of such common valleys under the heading of rivers is apt to prevent the student of geography from appreciating their importance. But this is only another way of saying that the geological method is unsuited to the needs of the geographer.

Similarly, because of his definitely historical standpoint, the geologist is intensely interested in the cycle of erosion, for precisely the same reason as that which makes the student of sociology interested in the social polity of primitive peoples. The latter hopes to find among such people indications of the stages through which the society in which he lives has passed, and thus to be enabled to trace the history of that society. So the geologist, finding that rivers at the present time are at different stages in development, naturally studies those stages with care in order to be able to formulate, as fully as may be, the whole history of the development of a river from its first origin. But the geographer is chiefly interested in the fact that rivers which represent different periods in the cycle have different effects on the life of man, and it is these effects which interest him more directly than their causes.

Let us turn once again from this negative discussion of river treatment as it appears in most text-books to a more positive one, and try to explain how it is that the different parts of a normal river valley are more or less suitable for the construction of prepared tracks, or for the process of forcing a passage through an unknown and roadless land.

Note in the first place the distinction which the geologists have laid down between the two main parts of the course of a river, that where corrasion exceeds deposition, so that the valley is being continuously deepened, generally called the valley track, and that where deposition exceeds corrasion, the plain track. We perceive at once that the distinction is for us insufficient, for in the plain track there is obviously an upper region where corrasion is still going on, if on a small scale, and a lower region, where the river is close to base-level, and no deepening of the valley is going on at all, while deposition may be copious. This lower region has in the general case no significance as determining lines of communication, or no direct significance, and this for several reasons. In the first place the river here is flowing through a low

plain—we need not stop to consider the question of the extent to which it has formed the plain in the various cases—over which it tends to meander, often in wide swings. In the normal case the plain will be widest in the lowest part of the river's track, and further, unless in the case of very small land areas, or very mountainous ones, the probability is that other approximately parallel rivers will also exist, not separated by any noticeable divide from the first river. Plains of this kind are generally suitable for human occupation, and the fact that they extend on either side of rivers tends to divert lines of communication from the transverse direction across the plain to the longitudinal one. There is no special difficulty in the way of communication in such a region, and the probability that large settlements will be found on the successive rivers, at approximately a similar position on each, makes it likely that main lines of communication will run from town to town, and not from river mouth to the interior.

In such cases, therefore, the river valleys are not of advantage in constructing tracks, rather are the rivers an obstacle, often a very considerable one. As an example I may point out the way in which the great railway trunk from Berwick to London, no less than the Great North Road, crosses successively all the considerable streams of the east of England, the direction of road and railway at particular points being determined by the necessity for traversing the streams where conditions are suitable for bridge building. The railway from Edinburgh to Aberdeen offers another example of the same thing, the wide river estuaries here being very noticeable obstacles to communication. In both cases of course the plains are coastal plains, but the great plain of Lombardy is an example of an inland plain where the lines of communication run transversely to the tributary streams of the Po, which here represents base-level. The way in which the towns of the plain are strung upon the streams here is very characteristic.

There are of course many cases in which the general direction of the river valley represents that in which it is convenient for a track to pass, even in the case of the lowest part of the river's course. But it is noticeable that in the general case it is only the direction that is adopted —not the actual valley. The railway route from Havre to Paris is an interesting example, though the condition is common enough, and the very striking contrast should be noticed between the relation of railway to river above and below Paris. Below, the two have in common little more than general direction: above, as all travellers know, the line hugs first the Seine, then the Yonne, and then a tributary, with the most extraordinary closeness.

The reasons are of course quite obvious. In the lowest part of its course a river tends to meander over its own flood-plain, the meanders being very large in the case of the Seine, both above and below Rouen. To follow the curve of the meanders is to take a roundabout route, while the attempt to cut them off directly involves constant bridge-making, or a notable delay to progress while the river is crossed. Further, in the lower part of a river's course the risk of flooding, of changes in the course, and the frequency of marshes and swamps, renders too close

proximity to the stream inadvisable. It is quite usual therefore for roads and tracks to run at some distance from the stream, even on the low crest between adjacent streams.

Further up, where the valley is narrower, the divides between adjacent streams higher, a closer approach to the river valley is generally necessary. But this is only another way of saying that when, as happens in the vicinity of base level, the river and the other surface agents have completed their work of preparing the surface for man's activities, then the valleys have lost for him much of their significance. Only when the work of the stream is half completed is man bound more or less closely to its banks.

But the presence of road or railway track close to the bank of a stream is to be regarded, in the general case, as the product of a somewhat advanced civilisation. Though in the section in which we are now considering the river swings over its own flood-plain only to a minor degree, and river terraces of convenient height may be present, yet under natural conditions the risk of flooding is considerable, and the probability of the existence of dense vegetation, especially bushes and small trees, makes a valley path more or less difficult till the control of the stream, the clearing of the ground, and so forth, remove the worst of the difficulties. Thus it is not unusual to find, even at the present time, an older road which lies at a varying height on the slope of the valley, co-existing with a new turnpike, and perhaps with a railway, which keep close to the stream and avoid the heavy gradients of the old road, but involve heavy outlays for bridges, levelling, and so forth.

An interesting point arises here in connection with the difference between normal V-shaped river valleys, and U-shaped glacial valleys. In the former case the nature of the slope of the bank often makes it easy for the road or railway to avoid the river flats, but the steep sides of the U-shaped valley make it necessary in this case to utilise the valley floor. This involves extensive stream control, embankments, etc., a fact well illustrated in *e.g.* the Rhone valley above Lake Geneva, as well as in many other Alpine valleys.

An important character of the upper part of the plain track deserves mention here. This is the fact that it is in this region that the great tributaries tend to enter, as contrasted with the small ones of the valley track. These large tributaries, each more or less repeating the features of the main stream, offer a choice of routes, and thus increase the importance of the route down the main stream beyond their point of entrance. It is of course a geographical commonplace that towns tend to spring up at the junction of great tributary and main streams, largely on account of this choice of routes, and the consequent concentration of the commodities which enter into trade.

The great tributaries of the Seine form an excellent example of the effect of converging streams upon lines of communication. We have already alluded to the way in which the great route from Paris to Dijon follows the Seine, then swings off to the more convenient Yonne, and again abandons this for the smaller Armançon, in its effort to find a route at once easy and direct up the slopes of the Côte d'Or.

The illustration leads up to a point which is of course perfectly obvious, and yet rarely finds direct expression in geography books, that one reason for the adoption of the line of a river valley—or as near an approximation as circumstances permit—in a region of considerable slope, is that the river line is, under normal conditions and when taken as a whole, the gentlest slope obtainable, owing to the way in which, by a combination of corrasion and deposition, the river smooths out irregularities, and produces a curve of water erosion. Although all discussions on the physical geography of rivers discuss this question of the curve of water-erosion, it is, I think, at least rare to find it stated that they are in this way preparing a pathway for man.

When we come finally to the valley track, and to that upper portion of it which is often called the mountain track, we find that the river valley as a line of communication is least useful where its need is greatest. In this region the slopes may be so heavy that only where they have been subdued by the action of running water can they be attacked at all, and yet the valley may be so narrow, so steep-sided, that the construction of a track may be virtually impossible within it, at least in times of flood. In the Tyrol there are some curious examples of cases where the path in summer actually occupies what is in winter the stream bed, and similar conditions are not infrequent in limestone regions where the water only flows at the surface at certain times. All such paths are, of course, temporary, requiring to be renewed, or at least extensively repaired, after every season of flow, and they are geographically analogous to the winter sledging tracks along the ice of such rivers as the Yukon. In some cases, as on the Brenner route, it has actually been found advantageous to divert the stream from its course at one special point, in order to utilise its bed for the railway track.

In most regions of sharp relief, however, which are, in the cases most familiar to us, found in regions which have recently undergone glaciation, the alternation of heavy and moderate slopes is very constant. In the former the stream rushes, broken by rapids and falls, through a narrow gorge, while in the latter it flows more quietly, often between low banks, built up of its own deposits. In such cases the path or road tends to avoid the gorge altogether, and "quarters" the slope, often in great zig-zags, to approach the stream again closely in the basin which usually lies above the gorge. Every one who is familiar with Alpine paths and roads could give dozens of examples of this, while the elaborate devices by which the railway solves the problem are illustrated very beautifully on the Brenner route, as well as on many of the minor tourist lines of the Alps.

Generally then we may say that if we take a river which has practically reached the normal curve of erosion, we find that the valley in the lowest segment is not likely to be used as a main line of communication, the middle segment is almost certain to be used, while the uppermost one can only be employed with great difficulty, and after elaborate preparation.

The whole of the above discussion has been based upon the conditions found in a "normal" river. There are of course many examples of rivers

which, owing to captures, or to earth movements, or to a combination of the two, show marked abnormalities on their course. I have elsewhere emphasised the number of examples of such rivers to be found in the Balkan peninsula, and the effect of these upon the history and development of that region. It is, perhaps, sufficient to say here that if the course of the Tzerna river had been of the usual type, the two campaigns for the possession of Monastir (those of 1912 and of 1915) would have been very different from what they were.

The whole of the preceding paper has been devoted to a consideration of rivers as affording natural lines of communication. It is not intended to suggest that this is their only importance in geography proper. Indeed it would have been equally possible to have regarded as their most important function that of preparing for man those wide alluvial plains on which his agricultural crops grow best. Apart from direct deposition, also, the way in which they fill up lakes, and gradually convert them into dry land, is of great geographical importance. But all that has been attempted here is to show that in addition to the purely geological treatment, which is the only one attempted in most text-books, it is possible to look at rivers from the geographical standpoint, and to lead up to the conclusion that in combination with atmospheric agencies they prepare the surface first for the use of a great variety of plants and animals, and second for that of man, and his domesticated animals and cultivated crops, and for the process of interchange upon which he depends almost everywhere. In conclusion, I wish to suggest the desirability that what it has been attempted here to do in briefest outline for rivers should be done for most branches of physical geography.

As was stated at the beginning of this paper, the subject of physical geography is at present in a very chaotic state. It is not too much to say that a student, picking up a text-book on the subject, can form only the vaguest conception of the probable contents of the volume. To avoid being invidious, an example may be taken from foreign instead of from English books. We have in de Lapparent's *Leçons de Géographie Physique*, and de Martonne's *Traité de Géographie Physique*, two admirable books of, it will be noticed, quite similar titles, and yet the two differ from each other not only in their mode of treatment, but very markedly in their contents, and this although both, within the limits set, are remarkably comprehensive, and on the whole more geographical in type than similar books in the English language. De Lapparent's book especially could scarcely be neglected by any geographer, however closely he wished to confine himself to human geography proper, for it gives admirable descriptions of the relief of the different continents. Surely this want of any consensus of opinion as to what constitutes physical geography is a grave misfortune.

Further, so long as geographers are content to take over from geology, without modification and with but little selection, the basal material of their science, so long will they be regarded, naturally enough, as mere popularisers of other men's work. That this view of geography has not yet disappeared has been more than once indicated at the meetings of the British Association, and the discussion on Land Forms at the

Manchester meeting, whatever else it did, showed at least that some geologists hold this opinion very firmly. While it is current, geography proper, for economic reasons if for no other, is not likely to make much headway. If our duty is merely to glean in the fields that others have sown and reaped, the subject is not likely to take in universities and in the public estimation the place which we think is its due. If this paper stimulates any one to discuss in fuller detail the problem of how the whole subject of physical geography should be treated by the geographer, it will not have been written in vain.

BABYLON AND BABYLONIA: A REVIEW.[1]

(With Illustrations.)

THE appearance of the second of the trilogy of volumes which Mr. King is preparing on the ancient history of the Mesopotamian lands has been most opportune. At a time when British troops are in possession of the Tigris valley as far as Kut-el-Amara, the history of the land—the home of the most ancient civilisation in the world—will be read with special interest. The volume under consideration covers the whole of the long and eventful history of Babylon, from the time of the conquest of the non-Semitic Sumerians, the earliest known inhabitants of the land, up to the final decay of the city under the later Persian kings, and finally under the rule of Alexander.

Of special interest at the present time is the discussion as to why Babylon, from its geographical and economic position, should have been so long a centre of cultural influence, and dominated the ancient world, both commercially and politically. Mr. King shows (Fig. 1) that the political centre of gravity, from the earliest times when the city-states were gradually merged into one consolidated kingdom, pivoted round a region of very small dimensions. For almost 3000 years the city of Babylon herself held sway, and after her decay the later capitals of succeeding conquerors, Seleucia, Ctesiphon, and Baghdad, all arose within quite a short distance of the ancient city. Babylon owed her long supremacy not only to her being the centre of an extensive caravan trade, and to her strategic position at the point of greatest convergence of the two great rivers Tigris and Euphrates, but more especially to the skill of her early monarchs in devising an extensive system of irrigation canals, which enabled the extraordinarily fertile alluvial soil to be fully taken advantage of, and literally made "the desert to rejoice and blossom as the rose."

For the last two decades the eyes of the two dominant European powers, Britain and Germany, have been longingly directed towards that ancient cultural land—the site of the Garden of Eden—which under

[1] *A History of Babylon.* By Leonard W. King, M.A., F.S.A., Assistant in the Department of Egyptian and Assyrian Antiquities, British Museum. London: Chatto and Windus, 1915. *Price* 18*s. net.*

Turkish misrule had been allowed to revert to its primitive desert condition; and while Britain created for herself a sphere of influence in the south, by way of the Persian Gulf, and by instituting a service of steamers on the Tigris, Germany planned to approach the coveted Baghdad from the east, by way of the German-owned railroad, the "Baghdad Bahn," from Constantinople through Anatolia. It was not sentimental reasons that lay behind these activities. Both powers knew that the wealth of ancient Babylon might easily be revived, and her magnificence restored. Both powers knew that the alluvial plains

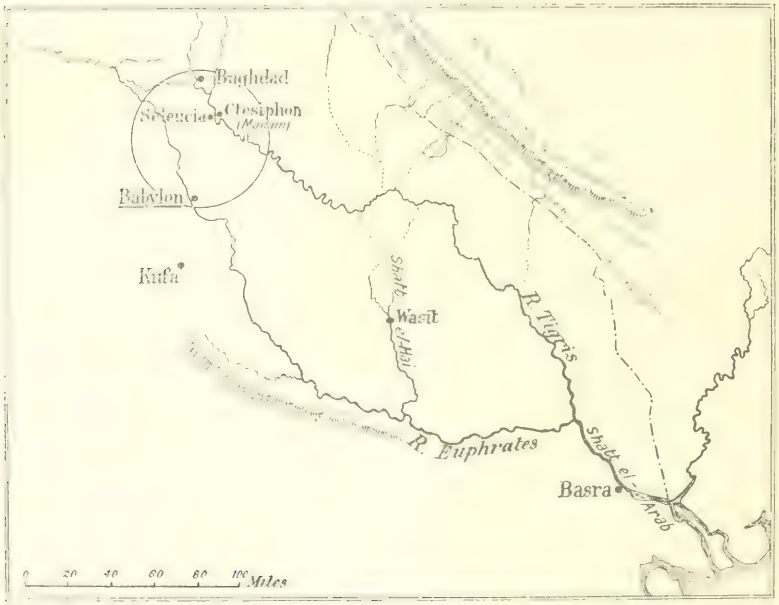


FIG. 1.—Diagram to illustrate the political centre of gravity in Babylonia.

The circle marks the limits within which the capital shifted from the period of the First Dynasty onwards. It was only under the abnormal conditions produced by the Moslem conquest that Kufa and Basra became for five generations the twin capitals of 'Irâk; this interval presents a parallel to the earlier period before the rise of Babylon.—From *A History of Babylon*.

of Mesopotamia were destined to become one day the granary of the world and the chief source of the world's cotton supply. Sir William Willcocks published in Cairo a few years ago, a brochure containing the results of his survey of southern Babylonia, in which he showed that at the expense of a few million pounds the ancient canals dug by Hammurabi and his successors might be cleaned out, and new canals dug, and the whole plain become extraordinarily fruitful. Thus it is because they hope that a new Babylon will rise as "Mistress of the World" out of the ruins of the old that the two great European powers are contending for its possession.

Mr. King in this volume traces the incursion of the Western Semites

from Arabia into the land of Mesopotamia, where they overthrew the

FIG 2.—Upper figure, a small Kelek on the Tigris at Baghdad. Lower figure, Ferry Boats on the Euphrates at Birejik.—From *A History of Babylon*.

indigenous Sumerians. He conjectures that the great Semite invasion was due to a diminished rainfall in Arabia, compelling the nomad and

pastoral Semitic people to forsake their own land and break in upon the agricultural lands of the Sumerians. The Semites were never a race devoted to land culture, and the change from being a pastoral to becoming an agricultural people, must have been forced upon the Semitic Babylonians by the exigency of the drought and famine in their own Arabian cradle-land.

Mr. King describes vividly the rise of the first great Babylonian Dynasty, which reached its climax in the reign of Hammurabi, the Law-Giver. It is surprising the high degree of civilisation which the law code of Hammurabi exhibits. The position of woman, for example, with regard to divorce, marriage, and the possession of property apart from her husband, was at least as high as in most European countries to-day, and the laws regarding the irrigation of the land, insurance against slovenly workmanship on the part of both surgeons and builders of boats and houses, are very strict and most modern in tone.

The history of the conflicts of Babylon with the kings of the sea-country in the south, where the Sumerian nobles contrived to resist the victorious invaders, the coming of the Kassite Dynasty, and the long fight for her existence, now against the Hittites, now against Egypt, and her overthrow by her northern neighbour Assyria—and her final emergence for a brief period of scintillating brilliancy under Nabopolassor and Nebuchadnezzar—the history of these mighty movements, covering a period of almost 2000 years, is narrated by Mr. King with all the wealth of detail which only an expert such as he can bring to the work. In his history Mr. King has made use of all the materials that recent investigation has brought to light, and he shows that there must be considerable modification in the dating of the early Babylonian kings, as some of the lists of early kings that were formerly considered independent, show kings of southern Babylonian cities contemporary with others.

An interesting chapter of the book is devoted to a summarising of recent exploration work in the ruins of the city of Babylon itself, and Mr. King has given the English reader a succinct account of the discoveries of Robert Koldewey and the German Oriental Society, in their work of uncovering the Ishtar Gate, the great Processional Street of the God Marduk, and the reputed site of the Hanging Gardens of Babylon.

But perhaps the most interesting part of the work to the non-specialist reader is the last chapter, in which the author tries to sum up the cultural influence of Babylon on the mythology of Greece and on Europe as a whole. He shows himself unsympathetic to the Winckler school, who would derive practically the whole of European mythology from Babylonian astral myths. In his zeal to controvert the Wincklerians, Mr. King perhaps does but scant justice to the importance of astrological ideas in dominating Babylonian life and culture: for although certain disciples of the late Hugo Winckler make wild hypotheses that never would have been countenanced by their master, the exaggerations of these zealots should not make us shut our eyes to the undoubted influence of Babylonian cultural ideas on the Hebrews and Greeks, and through them, on the whole of the European peoples.

The nation should be indebted to Mr. King for his monumental history—a work which should maintain its place as a standard book for many a year to come. He has succeeded in incorporating into a volume of reasonable size everything worth preserving in Babylon's history, and has collected and collated with much diligence the results of the laborious researches of scholars that are hidden away in the Proceedings of British, French, American, and German Oriental Societies. British scholarship should be proud of Mr. King's *History of Babylon*.

The book is well illustrated, and by the courtesy of the publishers we are enabled to reproduce some of the illustrations here.

THE SO-CALLED MYTHICAL ISLANDS OF THE ATLANTIC IN MEDIÆVAL MAPS.[1]

By William H. Babcock.

The Islands of Antillia.

When Peter Martyr d'Anghiera, in his *Decades of the New World*, narrated, about 1511, the coming of his contemporary, Christopher Columbus, to Cuba and Hispaniola, he added the following significant statement, now quoted from Eden's early translation:—

"Turning therefore the stems of his ships toward the east, he assumed that he had found Ophir, whither Solomon's ships sailed for gold. But, the descriptions of the cosmographers well considered, it seemeth that both these and the other islands adjoining are the islands of Antillia."

That Florida was understood to be one of these "islands adjoining" appears from his accompanying sketch-map, wherein Cuba clearly is the chief island of the group, with a belt of territory above it inscribed in Latin, "part of the island of Beimini." The upper map-border leaves no room for a fuller representation. A strait very properly separates them. Schoner's globe gores of 1515 illustrate the same island as of great area, without name, but Leonardo da Vinci 1514, with like delineation, names it plainly Terra Florida.

Peter Martyr's group-name is closely paralleled in form, and almost exactly repeated in sound by "Antilhas da Cassetela" (Castile), similarly applied in the same way on a Portuguese map of about 1518 copied by Kunstmann, plate iv. Already, and even earlier than Peter Martyr, Canario's map, 1502, had, for the first time, presented together the individual island-name Cuba, and the collective group-name Antilie, thus, with a similar and nearly simultaneous suggestion of Columbus himself, apparently establishing the form Antilles, which has remained in general use until now.

The last-mentioned map also antedated Peter Martyr's representation of Florida as Beimini, for a fragment of the former appears on it above

[1] For earlier articles see vol. xxxi. p. 531 *et antea*.

Cuba, without name. The lower end of this peninsula was evidently better known than its upper part, and believed to be severed from the mainland, though the division line was sometimes placed as high as Cape Fear.

But the name Antillia also continued in use to mark a single large island, or the principal island, where more than one were shown. On the map of Ruysch, 1508, prepared with some knowledge of what Columbus and Cabot had found, and the 1492 globe of Behaim, constructed while Columbus was still at sea, Antillia is still alone in mid-ocean: the Laon globe, apparently somewhat earlier in the main than Behaim's work, shows two oceanic islands, Antela and Salirosa. The often-published letter of Toscanelli to Columbus mentions "Antillia which you know," and recommends it as a convenient stopping point on the way to Asia. The map illustrating his advice went presumably with Columbus across the ocean on his first voyage and back again. It is known to have been in existence afterward, but somehow disappeared. Its rediscovery is much to be desired. In the meantime there are at least two conjectural reproductions,[1] which do not agree. Both cannot be altogether correct, and probably neither is so. About all that we know of Toscanelli's Antillia is that it was in the latitude of Lisbon, and something like two-fifths of the supposed distance to Japan. Evidently he considered Antillia important, and an oceanic, not a continental, island. But no man can really reproduce his map.

There has been much discussion as to the origin of the name. Its earliest appearance is as Atiliae (or Atuliae) in a rather obscure inscription of the Pizigani map of 1367, unusually eccentric in orthography. The omission of *n* recurs in the Atilhas of the Portuguese map mentioned above. But there seems no reason to think that the change from Antilla is in either instance more than incidental, especially as Atilhas would be pronounced Atillias. During the intervening period we meet with Antilla, Antilie, and Antela.

One of the earliest hypotheses derived Antillia from Atlantis; but this requires an unnatural transposition of consonants. Atlas is the basis of Atlantis, and cannot reasonably be transformed into anything beginning with "anti," "ante," or "ati."

The variant Antela of the Laon globe is identical with the name of Lake Antela of Galicia,[2] the parent of the river Limia, which was popularly identified with the fabulous Lethe, so that Roman soldiers dreaded to cross it, lest they should forget all things. Ruins of a Roman city have been found on the bank of this lake, which was doubtless widely known in the Dark Ages, and might well confer its name, possibly by seamen of its own sea-shore region, on some discovery of a land sharing the same attributes of myth, marvel, and remoteness. But it must not be forgotten that this form of the name for the great western island occurs only once, accompanying the equally pretty but meaningless name Salirosa applied to a neighbouring island. We may

[1] The older and better known is adopted, *e.g.* by Kretschmer and Nordenskjold, and the more recent (Wagner's) is in Schott's *Geographie des Atlantischen Ozeans* (1912).

[2] Meakin, L. M. B., *Galicia, the Switzerland of Spain*.

more safely see in them an advanced stage of verbal modification, keeping pace with a loss of sense of the original meaning, and merely happening to yield a coincidence in the case of Antela.

Humboldt[1] suggested for Antillia the root Altin (the dragon or serpent), citing in support those nightmare monsters of maps and legends which enhanced and deepened the terrors of the Sea of Darkness. We may find a specimen in a sixteenth-century illustration of Olaus Magnus depicted in the act of dragging a seaman from a ship's deck to his lair[2] (cf. Pizigani's map discussed in vol. xxxi. p. 534). Two centuries earlier still Edrisi[3] describes an Atlantic island as the scene of the slaying of a particularly destructive creature of this kind by Djou l'Carmain, who seems a composite personality, including Alexander of Macedon and Hercules at the least.

But there is no particular reason for linking such conceptions to Antillia, which always comes before us, not like Inferno, the Isles of Demons or the Isle of the Hand of Satan, but with gracious, admirable, and even sacred associations—in this more nearly resembling Brazil or the Fortunate Islands of Saint Brandan. Moreover, "Altin" must be as greatly distorted as "Atlantis" to produce "Antillia."

Illa is one form of the Portuguese ilha on many maps, the pronunciation being illia; the meaning, island. This leaves only the first half of the word to be accounted for—naturally by "anti," opposite, or "ante," before. The latter has generally been preferred, being sometimes explained as alluding to the position of the island before the eastern face of some undepicted but conjectured shore-line, or before known lands of the Old World. Most likely the latter is the true interpretation. Ante-ilha, certain to be pronounced Antillia by the inevitable slurring of the two similar middle vowels thus brought together, would be a very natural name to apply to an island lying off Europe out in the Atlantic, it being pushed farther west by stages as new islands became old and familiar, until at last it could go no farther if applied to an island at all. This explanation puts no strain upon sounds, letters, or the ordinary human treatment of names. It is supported by the parallel case of the nearest island, Reylla (Reyilla, King-Island), of that great far-western group which derived its collective name from Antillia, and must presently be more fully considered.

Such a progressive westward shifting is not quite uncorroborated. From a very early period Antillia was habitually identified with the Island of the Seven Cities, the legendary refuge of the Portuguese prelates and their flocks who sailed out of Oporto, escaping the clutches of the Mohammedan invaders. There is every probability that such desperate flights by sea really occurred in the hour of supreme need. There was no spot more likely to receive the fugitives than St. Michael, the nearest and greatest of the Azores, an ample and delightful new home, free at least from present danger. Here, on this island of St.

[1] *Examen Critique*, vol. ii. p. 211.

[2] Winsor, J., *Narrative and Critique, History of America*, vol. i. Tilinghast's Monograph, p. 50.

[3] *Geography*. Third climate, first section.

Michael, a certain region marked by the ruins of human habitations has long borne the name of "The Seven Cities." Buache[1] infers that St. Michael was Antillia first and last. Humboldt[2] replies that the same reasoning would require us to find Antillia in Coronado's New Mexican or Arizonian Seven Cities of Cibola. But the instances are not quite parallel, for the situations differ widely. St. Michael was a probable refuge when Zuni was not even a possible one; furthermore, St. Michael lay "before" Europe, and was an island, whereas the Hopi villages and Zuni were not insular, nor "before" anything. But Humboldt, as stated, chose an Arabic, discarding the Portuguese, derivation, so the latter consideration could not weigh with him.

But if St. Michael ever were Antillia to Portugal and her neighbours, the name passed westward. That island is more eastward and southward than Terceira of the middle group of Azores. Antillia (Atilha) is indicated on the Pizigani map of 1367 very much farther north-west, a location which best accords with that really occupied by Corvo. No island outline is drawn, but there is a picture of a gigantic inverted warning statue, apparently based on the middle of a medallion, containing the figure of a man wading knee-deep in water, with a shadowy figure looming before and almost over him, and what may be an elongated mountain summit or ridge in the background. The inscription in Latin tells us that this statue is placed on the shore of Antillia to mark the limit of navigation, and that a foul or encumbered sea is beyond it, through which vessels' prows cannot be driven. This seems a distinct record of knowledge of the Sargasso Sea, which lies between the outer Azores on the north-east and Bermuda and the West Indies on the south-west. No doubt a short trial by early mediæval mariners would earn for it the name of an insuperable obstacle, even if it were sometimes successfully evaded or traversed.

Clearly, then, in 1367 these experienced map-makers, whose work found its best market among practical sea captains, understood Antillia to be the farthest land from Europe east of the Sargasso Sea, in the latitude of upper Spain. This seems conclusive of Corvo or Flores, which lie but thirteen miles apart, and may well have been considered together with no care for distinction or division. They lie so clearly before and remote from the main body of the Azores that their title to be included in that archipelago has often been doubted. A number of years elapsed after the rediscovery of the other Islands of the Sun by the Portuguese before this outlying pair were likewise found again, migratory birds guiding the search. All through the series of mediæval portulan maps the distinctive importance attributed to the outpost rock of Corvo is a remarkable feature. Its name has lasted without substantial change from about 1345, and perhaps from a much earlier time, until now. It is generally exaggerated in size, and given a prescriptive artificial form.

It seems, indeed, to have attracted attention very much earlier,

[1] Buache, N., *Recherches sur l'Ile Antillia, etc. Mémoires de l'Institut de la Classe des Sciences, Mathématiques et Physiques*, vol. vi. p. 85 *et sup.*

[2] *Examen Critique*, vol. ii. p. 221.

being the only Atlantic island where Phœnician coins have been found (specifically those of Carthage and other towns in Northern Africa). Humboldt[1] accepts this hoard as authentic, and points out the significance of the fact that all its coins were of that mintage.

He[2] shows also that the warning image—that strange adornment of the Pizigani map—is not without a curious kind of inverted support in "the tradition of an equestrian statue found by the Portuguese on the isle of Corvo, and pointing west with the finger. All the elementary books which treat of the discovery of America report the tradition without indicating what historical document, Spanish or Portuguese, mentions it. I have vainly sought this sailors' yarn in the writings of the conquest which have so fully discussed the hints by which Columbus was guided toward the lands of the west. Martin Behaim, after having long sojourned in the Azores in the house of his father-in-law, Jolst de Hurtor, does not mention it on his globe. Barros does not speak of it any more than Grineaus, 1532, Sebastian Munster, 1550, Ortelius, 1570, and Andre Thevet, 1575. The silence of the last named seems to me the more extraordinary in that he has himself reported an inscription in the island of St. Michael which he believes was engraved by the people of Judæa. It is only about a year ago that the celebrated botanist, M. Link, made known to me a passage of *l'Historia Sussi*, which repeats the tradition of an equestrian statue in the most circumstantial manner: —'In the Azores, on the summit of a mountain which is called the mountain of the crow (della Cuervo—Corvo), is found a statue of a man mounted on a horse without saddle, the head uncovered, the right hand resting on the withers of the horse, the left extended towards the west. The whole was placed on a pedestal (losa), which was of the same kind of stone as the statue. Underneath some unknown characters were carven in the rock.'"

In explanation Humboldt quotes Boid's *Description of the Azores* (1835), as follows:—

"This (Corvo) is the smallest of the new islands. It forms a jumbled mountain, and has received its name because, seen from a distance, it appears altogether black. Among a great number of absurdities, the ignorant and superstitious inhabitants assured me that to this island is due the discovery of the new continent, because of a promontory which juts far out into the sea towards the north-west, presenting the form of a person, the hand of which is extended toward the west."

Moorwood's[3] *History of Inebriating Liquors* (Dublin, 1838) records: "Portuguese writers allege that when they discovered Tercera (Corvo?), one of the Azore islands, an equestrian statue made from a slab of stone was found bearing an inscription on a rock beneath. The head of the man was bare, his left hand rested on the mane of the horse, and his right hand pointed to the west as indicating the situation of another continent."

In the foregoing post Columbian instances it will be observed that

[1] *Examen Critique*, vol. ii. p. 257. [2] *Ibid.*, vol. ii. p. 325.
[3] Page 322.

the statue, accommodated to the times, is a figure of incitement, not of warning.

In tracing the genesis of the conception in the passage above referred to, Humboldt begins with "the columns of Hercules, called more anciently the columns of Saturn or of Briareus," and cites Strabo as speculating that these may have been navigators' marks raised by the hand of man which have given names to the places where they were erected—but without specifying images or statues. Other writers adopted the same view. Passing on to the Arabs, Humboldt quotes Edrisi's statement that six statues had been placed on the sea-shores, the most eastern being at Cadiz, others in the islands of the Sea of Darkness; also Markoudi's assertion that there are six Fortunate Isles, and each has a statue to direct the vessels and show that there is no route beyond: also Ebn el Ouardi's reference to one of the statues erected on the summit of a mountain in the Fortunate Islands. Next in order the Pizigani statue is cited.

Humboldt adds: "We see how the limit has been carried progressively toward the west. The ruse of the Phœnicians placed it near the columns of Hercules; Scylax at Cerne; the middle ages, following the Arabs, near the Azores, where the bank of sea-weeds, the Sargasso Sea, had been seen before Christopher Columbus. The Images of Hercules and the statue of Corvo belong, it seems probable, to the same geographical cycle."

The pictured statue itself of the Pizigani map bears a few characters. All the statue below the hips is hidden by the medallion before described, but the abbreviation ST appears conspicuously on its body, and the straight label of the scroll or banderole running out therefrom bears three other letters, apparently L D S, though one cannot be certain of the middle one. In both instances S is turned around. Whatever the origin of the story about the statue, it had come by that time into orthodox and saintly associations, presumably with some saint especially dedicated to the protection of the mariner in the hagiology of the period.

The equestrian designs of North African Phœnician coins, and the image-erecting habits of these and other ancient people, for purposes of worship, limitation, or commemoration, ought not wholly to be overlooked in our inquiry. Strabo's supposition would fit it very well, and the distribution of statues farther afield is not hard to believe. In particular Corvo, as the farthest European bit of land, hidden in the ocean near a south-western marine barrier which must sometimes have seemed impenetrable, might especially suggest a warning memorial, and the memory of it might outlast any visible relic and take on new meaning with wider discoveries.

But the name Antillia was no longer appropriate to Corvo after the finding of other islands in the ocean beyond. That this happened (at a great distance westward) was clearly believed during the next century, and there is reason to accept the belief as well founded. Of course the old legends of Antillia would be likely to migrate to the chief of the new islands with that name.

Certain map-inscriptions and other entries throw some light upon the matter. Thus, on the Ruysch map of 1508, which presents between Cabo de Portugasi (Cape Race, Newfoundland) and the Azores, and obviously distinct from any of the latter, an Antillia of about the normal fifteenth-century shape and size, an inscription declares that Roderick, the last king of the Goths (in Spain) took refuge here from the heathen, also that the archbishop and six bishops settled on this island, whence it was called the Island of the Seven Cities. It gives no date of discovery more precise than "long ago," but seems to regard the island as known about the beginning of the eighth century.

(To be continued.)

JAVA, PAST AND PRESENT.[1]

(With Illustrations.)

In these two substantial volumes we have the results of much diligent research amongst the authorities which were available to a man in the position of the late Mr. Campbell. His long residence in the country, his official standing as British Vice-Consul, his ties of marriage to a Dutch lady of distinguished family, and, most of all, his keen interest in Java and the Javanese, combined to make him a suitable man for a task which appears to have been for him a labour of love. In his preface he says of the Javan people of the Dutch East Indies, "Their daily tasks, their religion, their amusements, their customs, their feasts, their life, I have quite entered into and lived in thought as one of them. Sorrows they have none, at least as we know them." Of how many peoples can the latter be said! It would be hard to pay a greater compliment to their Dutch rulers. We may say this of it, that, if the compliment be deserved to-day, it was not always so, judging by Mr. Campbell's records of Dutch relations with the people in days gone by.

Our occupation of Java from 1811 to 1816, when, as is well known, we annexed the island to prevent it from falling into the hands of the French during the Napoleonic wars, lends to it a special interest for all Britons, while the administration of the island during the above period under Sir Stamford Raffles was, on the whole, an episode of which we have reason to be proud, in spite of the fact that Raffles met with a cold reception at the hands of the East India Company on his return home, and that he died of a broken heart.

Mr. Campbell's enthusiasm in praise of the natural beauties of Java knows no bounds. To him it is "a garden of delight," "the ideal of all tropical lands, the most beautiful, the sweetest, and the most exquisite spot to be found anywhere." It seems, indeed, to justify the title which was awarded by the poet Camoens to the Portuguese colony of Macao,

"Gem of the earth and orient sea,"

[1] *Java, Past and Present.* By Donald Maclaine Campbell. Two vols. London: William Heinemann, 1915. *Price* 36*s. net.*

Victoria Regia lilies in the Botanical Gardens at Buitenzorg.
From *Java, Past and Present*

which is no doubt much more appropriate when applied to Java, while for the qualities of the Dutch rulers and merchants he expresses profound admiration. No doubt, in days gone by, *i.e.* in the seventeenth and eighteenth centuries, the Dutch colonial officers had a reputation for tyranny and rapacity—we know from the familiar couplet what they were supposed to be "in matters of commerce"—but as Mr. Campbell says, the question is, were our own records at this period very much better?

The origin of the Javan people is discussed at length and with much reference to authorities. The close resemblance which exists between the ancient monuments in Indo-China and in Java points to their common origin in a Buddhist people, and it is generally held that Java was colonised by a race of Hindu immigrants who probably came by way of Indo-China. The interesting speculations of some ethnologists who hold that the same Hindu stock trekked farther south to populate Polynesia, and ultimately to figure in New Zealand as the Maoris, are part of another story. Mr. Campbell traces the records of Arabian and Chinese intercourse with Java previous to the arrival of the first European visitors. Marco Polo, he tells us, has the honour of being the very first European visitor to the East Indies, as he came to Sumatra in 1292. But Mr. Campbell dismisses Marco Polo as "a prince of exaggerators," in which he does less than justice to the great Venetian traveller.

Coming down to later times, Mr. Campbell quotes extensively from the records of the Portuguese, the Dutch and the English merchant adventurers. The competition between the two latter nationalities for the monopoly of the trade in spices was fierce, and the quarrels of their agents were bitter. In this connection the story of the torments which the Dutch inflicted upon the people of the English East India Company at Amboyna in 1622 is a record of cruelties worthy of the worst days of the Inquisition. Mr. Campbell describes in detail the gradual rise of Dutch power in the East, until they became what they are to-day, undisputed masters of the East Indian archipelago. We may be permitted to quote the following:—

"The Dutch East Indies, at the present moment under a wise and beneficent administration upon which it would be difficult to improve, are blessed with peace. One can only hope that this may long continue. What the future of the Dutch possessions is to be it is difficult to say, but there can be no doubt that envious eyes have already been cast upon them, and that their wealth is well known to others."

The second volume of Mr. Campbell's book treats of the antiquities of Java, its fruits, flora, fauna, minerals, industries, etc.: but it is impossible to do more than mention them here. Mrs. Campbell says in an introductory note that her husband, at the time of his death in 1913, had left the material for a third volume, a commercial section, which may possibly be published later.

The author has woven into his book numerous bits and quotations from old records of Java which are sure to be of interest to any reader who wishes to specialise in the history of the island.

We notice a few typographical errors: for instance, at page 223,

Tjisarewa Lake, near Siudanglaya.—From *Java, Past and Present.*

and again at page 224, the date of the Dutch settlement of Malacca appears as 1541, which should be 1641; and again, at page 201, under the head of the Dutch in Formosa, mention is made of "*Tauranfoo*," which evidently stands for Taiwanfoo; while "*Tainsia*" is probably meant for Tamsui. We should have liked to see the sources of the authorities quoted more fully verified, and the index is rather meagre. These, however, are minor blemishes in a book which is in itself a monument of patient labour and research extending over many years. The illustrations, from photographs and from old prints, are numerous, and some of them are very fine. By kind permission of the publishers we are able to reproduce two of them here.

THE CALIPHS' LAST HERITAGE: A REVIEW.[1]

(With Illustrations.)

When Mr. Lloyd George described Austria as the "ramshackle" empire, he left no picturesque term that could be applied to the Turkish Empire. Yet in a greater degree the empire that is misruled by Turkey is ramshackle and moribund. It is an empire of whose vicissitudes in history we know wonderfully little, and of whose physical structure and economic possibilities we are almost equally ignorant.

Sir Mark Sykes's volume falls into two quite distinct parts of almost equal length. The first part gives a most vivid account of the historical development of the empire that is Turkey. Very wisely, we think, he deals with the region as a whole, and the reader is spared five separate yet interrelated histories of Asia Minor, Syria, Armenia, Mesopotamia, and Arabia. The earliest history of the region is rapidly passed over, and the author begins with the Persian Conquest (538 B.C.). Between this time and the birth of Mohammed the Greeks had imposed their military power and intellectual culture on the people, and had in turn yielded place to the Romans who, after an indecisive struggle against Parthia, were engaged in conflict with a new Persian dynasty. Both powers wore themselves out in the contest, and, if victory ultimately rested with the western armies, it left them so reduced as to be unable to resist the new power that was advancing from the south. In chapters vii. to x. Sir Mark Sykes gives a brilliant account of Mohammed—the man and his weaknesses, the prophet and his strength. Just as Christian missionary effort began after the death of Christ, so on Mohammed's decease in 632 A.D. his successors rapidly extended his religious influence by force of conquering armies—"Death, tribute, or Islam"—and "in twenty-three years the Moslems had conquered an Empire bounded on the north by the Caspian, on the south by the coasts of Aden, on the west by the Sahara, and on the east by the Hindu Kush" (p. 136). "To accomplish the unity of the Mohammedan commonwealth, the Caliph seems to have availed himself of every means

[1] *The Caliphs' Last Heritage: A Short History of the Turkish Empire*. By Lt.-Col. Sir Mark Sykes, Bart., M.P. London: Macmillan and Co., 1915. *Price* 20*s. net.*

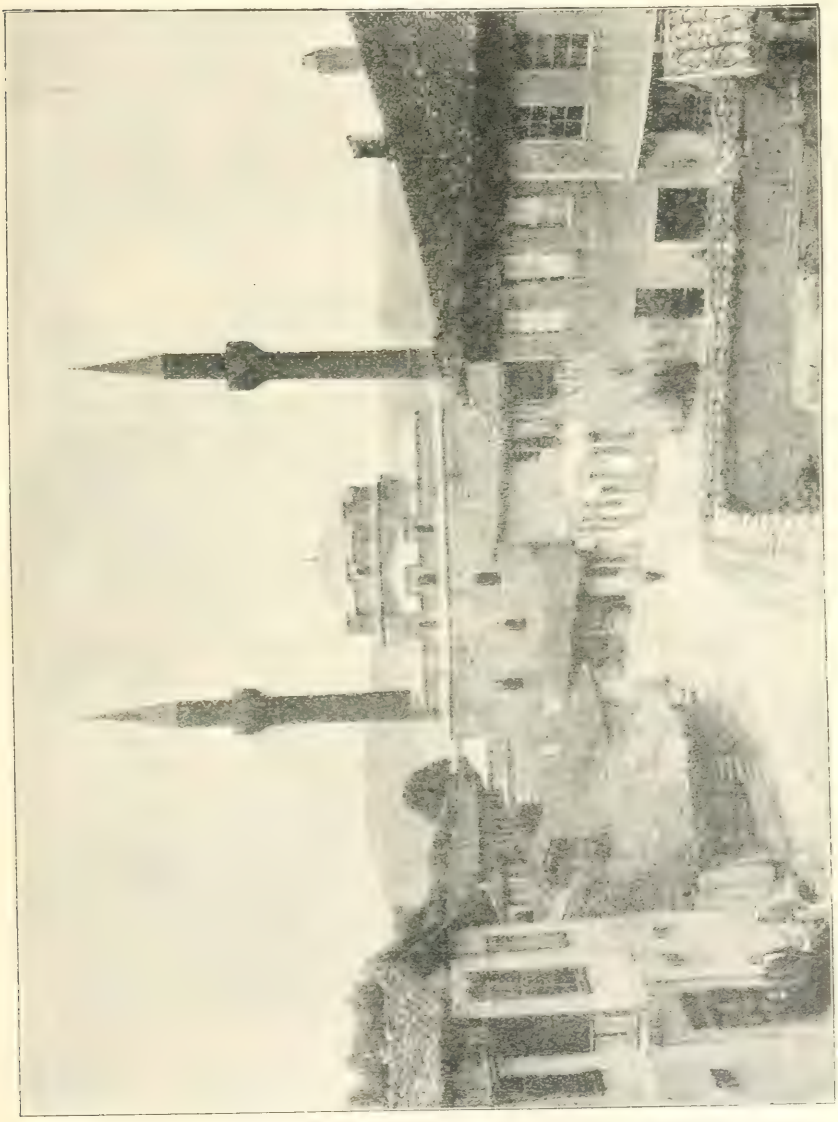
that came within his reach. His justice was that of a patriarch, his financial administration was borrowed from Persia, his secret service perhaps from Byzantium, his military organisation a careful development of the tribal system of the desert" (p. 141).

If under the rule of weaker caliphs the rapidity of the current of conquest was checked, it flowed on surely both in west and north-east, and in 748 the Omayyad caliphate controlled an empire stretching from Transoxania to beyond the Pillars of Hercules, including the whole of Spain, but excluding Asia Minor. This apparently anomalous result may be only partially explained by the natural difficulties of the mountain wall north of Syria, and may be due to slackening of effort in that direction as well as to the diplomacy of Constantinople. The author sums up the moving principles in the Moslem world thus: "The principle of Syria, where centuries of Roman rule caused men to tend to bear respect for worldly authority, and approved and comprehended an Imperial theory of government. The principle of Arabia, where the remaining people unconsciously leaned toward patriarchal aristocracy and severance from the outer world, since Arabia's geographical position allows of her people giving, but has never permitted them to receive. The principle of Irak, where all was argument, theology, fervour, zeal, contradiction, poetry, and metaphysical strife. The principle of the frontiers, where the spirit of Holy War ruled supreme and untarnished; for no matter what Caliph ruled, no matter what schismatic or civil brawls rent the Empire of Mohammed, the men of action still streamed East and West to slay or convert in the name of God, and publish the fame of his Prophet" (pp. 161-2).

Turkish incursions from Asia had led ultimately to the inclusion of Turks in the armies of Harun-el-Rashid (whose caliphate is shown to be decadent), and towards the end of the ninth century these mercenary troops besieged the Caliph Mustain in Baghdad, and "from this time forward the actual rule of the Caliphs practically comes to an end" (p. 246).

Into this disordered, disorganised, and decaying empire poured the trained hordes of Seljuk Turks. "Though the Moslems had vainly endeavoured to conquer Asia Minor for near upon 400 years, they had signally failed; the Seljuks overran and conquered the whole country with the exception of lesser Armenia in under ten years. The explanation is simple. Like the Parthians, the Arabs had been based upon Mesopotamia; their way lay through the Cilician gates, and their approach and lines of communication lay at right angles to the great parallel ranges of the interior. The Seljuks, like the early Scythians, the Achaemenid King of Kings, and the Alans of later times, began their advance from northern Persia. Once in Armenia, their armies marched directly down the valleys and plains between the ranges, so that no natural obstacle delayed their progress during the open weather, and once winter was over they were at liberty to take up their advance where the snows had arrested it" (pp. 254-5). There was one great difference between Mohammedan and Turkish rule. Mohammed had decreed that his followers should not intermarry with Jews or Christians, but should not attack them unless they were the aggressors. But the

Seljuks, although they had embraced Islam, played havoc with the Holy Sepulchre, oppressed pilgrims, and tyrannised over their Christian subjects. Alongside of this the Christian Church was anxious to



The town of Tyre, in Northern Asia Minor. From *The Caliphs' Last Heritage*.

re-establish its old boundaries; constant fighting between Mohammedans and Christians, especially at sea, made a struggle on land not unwelcome to the latter; and, as Sir Mark Sykes emphasises, feudalism made the idea of a Christian knight fighting for his Lord's heritage both familiar

and inviting (pp. 259-60). Hence the great religious and commercial struggle of the Crusades. The successes that attended the Crusaders were limited to the coastal area because they were consequent upon the control of the Mediterranean Sea. (The weakness of the Mohammedans in that sea is reflected in the two great markets they founded, for both Cairo and Kairawan are inland cities.) So that, as the author points out, "Geography dictated the limits of the time and space which this new rule should endure; because the Moslems lost command of the sea the Crusades were possible, but a power solely based on sea command cannot penetrate far into a continent where the valleys run parallel to the littoral" (p. 263).

Meanwhile Mongol raids on the north-eastern borders had driven thousands of nomads across Persia into Armenia, Mesopotamia, north Syria, and Anatolia. Among them was the little tribe of Sulaiman (the grandfather of Osman), which was granted a resting-place at Angora. This Ottoman tribe is the nucleus of the present Turkish dynasty. Ottoman power benefited by intercourse with the Greeks from whom, however, after attempts lasting for 100 years, it captured Constantinople in 1453. Sir Mark Sykes shows clearly that the capture of Constantinople was a curse rather than a blessing to the Ottoman Turks. "The Turks in taking Stambul let slip a treasure and gained a pestilence. The wisdom, learning, art, and philosophy fled to Europe to hasten the renaissance and elucidate the problems of the new learning; the villainous cruelty and falseness remained to distort and divert the development of the Ottoman Empire" (p. 291). With the conquest of Baghdad and the rounding off of the Ottoman Empire the historical account comes to an end.

In a travel chapter (chap. vii.) entitled "Huriyeh" the propaganda of the Young Turks is unfavourably criticised. The author sees no reason to congratulate the Turkish Empire on the change. The Young Turk is a complete failure. "It is easy to understand why Constantinople is changed more in essence than in appearance. The old evils, it is true, have gone, but new evils have come, and the old virtues are dying. Go where you will in Constantinople, you will find no signs of hope or vitality" (p. 509). Nor has the author any hope of benefits from German influence. "Germans, to begin with, have no instinct for developing a new country. Accustomed to state aid and to state management, to drill, discipline, and formality, they run their zealousness to seed in hosts of unnecessary official regulations, and in enormous expensive stations. At the same time, they neglect every interest of the land they hope to make their own" (p. 549). "Huriyeh" is confusion worse confounded.

It was, then, the kernel of the great Mohammedan Empire to which the Ottoman Turks finally succeeded.[1] Like the preceding dynasties

[1] "Ainsi, les Arabes avaient atteint d'un bond les Pyrenées et d'un autre l'Himalaya: et le croissant brillait sur deux mille lieues de pays. Cependant la géographie, la plus grande des forces pour ou contre les Etats naissants, condamnait leur empire à être bien vite partagé entre plusieurs maîtres, parce qu'il était trop étendu pour avoir un centre, et

they fell from their high estate. Their empire in Europe is slowly shrinking, and if the present war brings about their removal from Europe there must arise in us, as strongly as that of satisfaction, some feeling of pity—

> "Men are we, and must grieve when even the shade
> Of that which once was great is pass'd away."

Sir Mark Sykes's introductory chapter on the geography of the region may best be considered with the second part of his volume, because the journeys he made are naturally of greater geographical interest than the distinctly historical portion. He begins by showing that the Turkish Empire is peculiarly composite. He does this by stating categorically:

> "(1) There is an Ottoman Empire, a Turkish dynasty, a Turkish language.
>
> (2) The people of the Empire are Moslems, Christians, Jews, and Pagans.
>
> (3) The Moslems speak Turkish, two kinds of Kurdish and Arabic: the Christians Armenian, Greek, Arabic, and Chaldaean.
>
> (4) The official language of the Empire is Turkish: the religious language of the Moslems is Arabic.
>
> (5) The system of government is the direct successor of that of Constantine, yet its prestige is based on the theocratic method of the Caliphs and the patriarchal plan of an obscure nomadic tribe" (p. 2).

Nothing approaching a complete survey of the Turkish Empire has yet been made. We are dependent on travellers' sketches or traverses, and these cover only a small part of the total area. Sir Mark Sykes has made several route traverses which help to give some correct impression of the land between chosen points along the itinerary. Although the general physical map at the beginning of the volume serves to bring out the history of the region, it is of little value for geographical study: and the map showing the author's various journeys gives only general directions, and throws us back for details on such maps as our atlases provide. On the other hand, the purely historical maps give at a glance the political divisions of the region at various periods with great clearness, especially in daylight.

We are also dependent on estimates for any enumeration of the population included in the Turkish Empire, for the Turks have not completed the census begun several years ago. The estimated population of the parts of the Empire, together with the area and density of population, are shown in the following table, which is extracted from *The Statesman's Year-Book* for 1915:

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qu'il renfermait trop de peuples différents pour avoir de l'unité" (Victor Duruy, *Histoire Générale*, p. 231).

THE TURKISH EMPIRE.

	Area (sq. miles).	Population.	Population per sq. mile.
Europe, . .	10,882	1,891,000	187
Asia Minor, .	199,272	10,186,900	52
Armenia and Kurdistan, .	71,990	2,470,900	34
Mesopotamia, .	143,250	2,000,000	9
Syria, . .	114,530	3,675,100	33
Arabia, . .	170,300	1,050,000	6
Total, . .	710,224	21,273,900	30
British Isles, .	*121,633*	*45,370,530*	*373*

The author makes it clear that there is both accommodation and means of livelihood for vastly greater settlement, but that the prime necessity for securing such settlement is a stable, strong, yet sympathetic government, which by justice, tempered with mercy, will protect the farmers from nomadic raiders, help them to secure the best returns from their lands, and provide adequate means for marketing their produce. The ideal that occurs to us is the British government of India or of Egypt.

The general characters of the Turkish Empire are diversity and variety. The land surface varies from the high folded tablelands of Kurdistan and Anatolia, and the old worn-down plateau of Arabia, to the alluvial plain of Mesopotamia and the depression of El Ghor, 1300 feet below the level of the Mediterranean Sea; its temperature ranges from the tropical heat of the Red Sea shore or of southern El Ghor (which Professor Sir G. A. Smith authoritatively describes as "hell with the sun shining into it") to the sub-arctic region of Erzerum, "the Siberia of Turkey," with "a six months' winter whose mean temperature is —10° centigrade"[1]; its winter rainfall decreases from north to south, where Yemen alone benefits from the summer monsoon; its vegetation is rich, as on the shores of the Ægean and in parts of Mesopotamia, forested, as on the Black Sea littoral, steppe, as in parts of Anatolia, or sandy desert, as in parts of Syria; except in southern El Ghor wild animals are mainly represented by the pariah dogs of the towns; camels, horses, and countless flocks of sheep form the wealth of the nomadic tribes. The peoples who inhabit this diversified empire are themselves divided into many races and tribes. They range from the ruling Turk and the persecuted Armenian, the commercial Greek

[1] *The Nearer East.* D. G. Hogarth, p. 104. But the temperature given is surely too low.

and the ubiquitous Jew whose home is there, to the nomadic Kurd and the independent Bedawin. Government varies from pseudo-constitutional monarchy through incapable despotism to complete anarchy.

Of the life of the peoples living in such physical circumstances under such a régime the traveller has much to say. In view of the terrible atrocities perpetrated by the Turks among the Armenians, we recommend the reader to peruse Sir Mark Sykes's accounts of that people: they may serve as a corrective to much unbalanced sentiment and misdirected sympathy. He classifies them with the Yezidis and Circassians (p. 391). His attitude towards them is uniformly unsympathetic. We may make one quotation serve to illustrate this point. "That the Armenians are doomed to be for ever unhappy as a nation seems to me unavoidable, for one-half of their miseries arises not from the stupid, cranky, ill-managed despotism under which they live, but from their own dealings with each other. In a time of famine at Van the Armenian merchants tried to corner the available grain: the Armenian revolutionaries prefer to plunder their co-religionists to giving battle to their enemies: the anarchists of Constantinople threw bombs with the intention of provoking a massacre of their fellow-countrymen. The Armenian villages are divided against themselves: the revolutionary societies are leagued against one another: the priests connive at the murder of a bishop: the church is divided at its very foundation.

"Never was a people so fully prepared for the hand of a tyrant: never was a people so easy to be preyed upon by revolutionary societies: never was there a people so difficult to lead or to reform. That these characteristics are the result of Moslem oppression, I do not for one moment believe. That that oppression has been villainous, callous, and brutal, I do not deny: but that it has brought about the peculiar, fatal fatuousness of the Armenian people is beyond all credence. . . . If the object of English philanthropists and the roving brigands (who are the active agents of revolution) is to subject the bulk of the eastern provinces to the tender mercies of an Armenian oligarchy, then I cannot entirely condemn the fanatical outbreaks of the Moslems or the repressive measures of the Turkish government. On the other hand, if the object of Armenians is to secure equality before the law, and the establishment of security and peace in the countries partly inhabited by Armenians, then I can only say that their methods are not those calculated to achieve success" (pp. 417-18).

On the other hand, he is much more favourably impressed by the Kurds whom he has studied carefully. He has been able to prepare a map showing the approximate distribution of Kurdish tribes of the Ottoman Empire, and to give an Appendix of thirty-five pages dealing with these tribes. This is a fine piece of pioneer work, for little has been written on the subject.

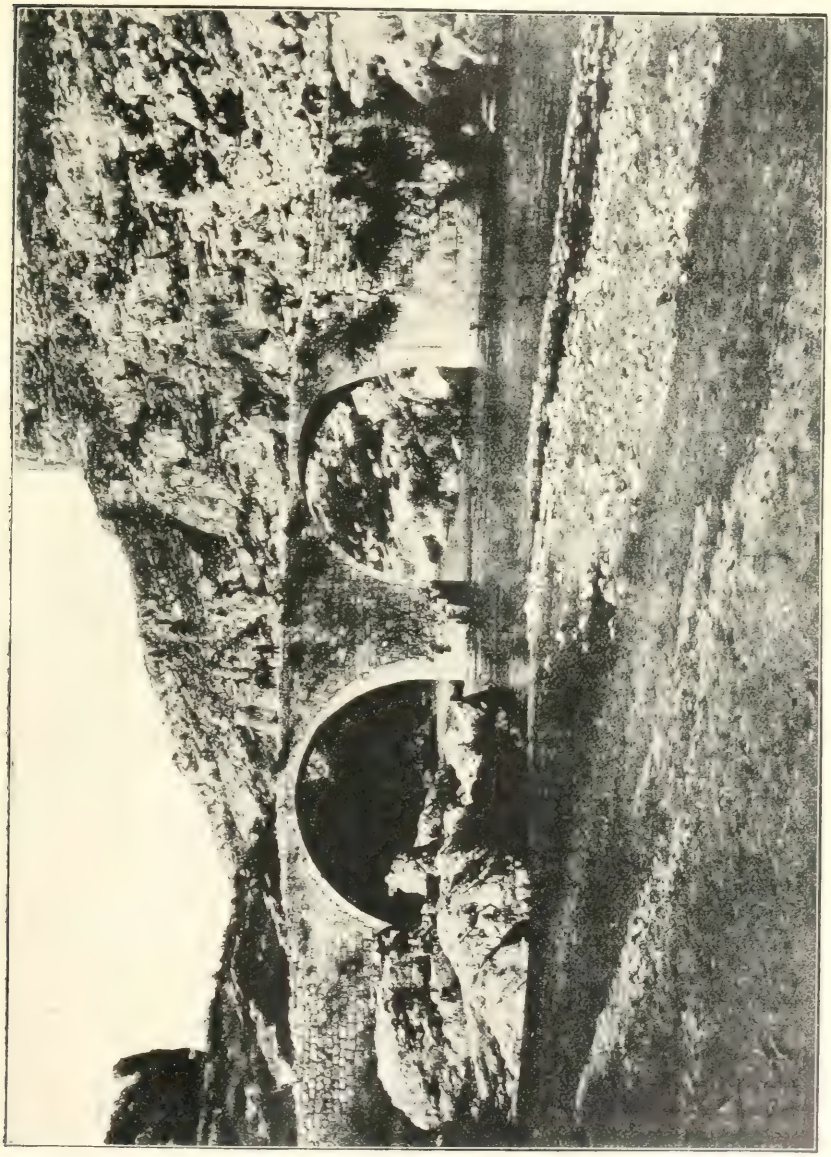
With such abundance of material as the volume possesses we can select only one or two areas in order to indicate its wealth, and in view of present events we select Mesopotamia. We give the name Mesopotamia to the river-plain of the Euphrates and Tigris. In this plain there are two regions, one above, the other below,

Baghdad. To the former the name Mesopotamia is correctly applied, but it is always called El Jesireh or "The Island" by the Turks and Arabs.[1] The latter, which we call Lower Mesopotamia, is known as Irak Arabi (to distinguish it from Irak of the Persians). Our author's journeys do not take him into Irak Arabi, and thus we are unable from the volume to throw any side-lights on the present campaign there. His great journey through the Jesireh in 1906 began at Aleppo (Haleb). Between that city (which he says has been largely rebuilt) and Meskene, on the westmost bend of the Euphrates, "stretches a glorious tract of corn-bearing land, spotted with brown mud villages, containing a mixed race of people who reply equally readily in Turkish, Kurdish, or Arabic to the question put by the passing traveller" (p. 301). The Jesireh, once a well-populated agricultural region, with a fine irrigation system and great caravan trade, is now abandoned to the Kurdish and Bedawin nomads and their flocks. "Between them these Kurds and Bedawin have made the Jesireh the merriest and most entertaining little kingdom of disorder" (p. 302). The author's advice to the traveller who seeks to enter the Jesireh is summed up on page 303. "When you go into the Jesireh it is essential to divest yourself of all preconceived notions. Wipe John Stuart Mill, Omar Khayyam, Burke, Ruskin, Carlyle, and Bernard Shaw out of your mind; learn the Book of Job by heart for philosophy, the Book of Judges for politics, the *Arabian Nights* (Burton's translation) for ethics; ride by balance, not by grip, keep your girths loose, look out for rat-holes, be polite and dignified in your conversation, *don't* talk about the superiority of the European civilisation, and you will learn a good deal. If you adopt any other line of conduct you will very likely get into serious trouble."

Crossing the Euphrates at Meskene the author travelled down-stream to Rakka (which is described on pp. 445-7), thence by a northerly route through steppe country capable of settlement in parts, especially in the Belikh and Khabur valleys. Between the Jagh-Jagh and Sinjar the country is real desert, passing near the latter stream "into an evil-smelling plain of salt marsh." Next the traveller reached the Sea of Khatunieh, which "is not only placed upside down on Kiepert's map, but also greatly exaggerated in size" (p. 332). After an unpleasant adventure at Sinjar the traveller reached Mosul, his account of which is singularly bad—"the same foul nest of corruption, vice, disorder, and disease as I have always known it." "To my mind Mosul stands as a menace to the future of the surrounding country, and I cannot help thinking that the projectors of the new railway would do well to try to avoid the town. . . . Although the idea may appear fantastic, I would strongly suggest that it would prove in the end a gain to the investor's pocket, if the company built the railway station ten miles from the site of the present city, and so laid the foundation of a newer and cleaner Mosul, in which some attention might be bestowed to sanitary regulations and public decency" (pp. 338-9). And a similar stream of invective occurs on p. 436. An excellent summary of Northern Mesopotamia is

[1] Stanford's *Compendium of Geography*. Asia, vol. ii. p. 335.

given in the diary of the return journey, where the former prosperity is contrasted with the present state and the future possibilities discussed



Roman Bridge at Solali, discovered by the author on one of his journeys. From *The Caliphs' Last Heritage*.

(pp. 440-1). In regard to the position of Diarbekir Sir Mark Sykes thinks that cartographers have made a serious blunder, either in the position they assign to the town "or in the track of the river-bed, as,

although many other landmarks answered my call, I could by no means make the minaret of the city other than due south. However, as my topographical efforts are those of an amateur, I am quite ready to bow my neck to German science, if it is prepared to maintain its position with a theodolite and sextant" (p. 361).

We may include in this part some reference to the author's account of the Mohammedan city of Baghdad. The foundation of Mansur's city was due to political exigencies, but there is little doubt that historical precedent and commercial instinct confirmed strategic demands. Where Euphrates and Tigris most nearly approach each other four great capitals have arisen.[1] Babylon gave place to Seleucia (Greek), which in turn yielded supremacy to Ctesiphon (Parthian). To Ctesiphon succeeded the Round City of Mansur, on the right bank of the Tigris, planned "with the object of maintaining the people in subjection, and the Prince and his ministers in security" (p. 217). The plan is fully detailed, illustrated by a coloured drawing, and its advantages to Mansur summarised (pp. 217-18). The natural market for the cultivated region, just as it was the key to the irrigation system (for here the Euphrates is 25 feet above the level of the Tigris, towards which therefore its waters descend), Baghdad grew in size and wealth as it became sunk in luxury and vice (p. 241). So it remained even under the Seljuks until Tulagu, in the great Mongol raid of 1257-8, ruined the whole irrigation system of Mesopotamia, destroyed the city and with it the very source of life. Though its early greatness has gone, Baghdad, in virtue of its position, still possesses much importance. The modern city is situated mainly on the left bank of the river, where railways will ultimately reach it—one from the north, another from Beirut *via* Damascus and Palmyra—and, "for want of a good port on the Gulf itself, once more make it the great emporium of West Asia."[2]

With regard to the Baghdad railway the author has one or two interesting remarks to make. He suggests an alternative route in the northern Jezireh *via* Mardin and Shedade to Mosul, and supports his suggestions by several economic reasons (p. 439). He found among the people an intelligent anticipation of the economic benefits that would follow the laying of the line, as *e.g.*, at Erbil "not a single word of dissent was expressed when an old man, in green robes and an enormous white turban, ventured to voice the opinion of the assembly by saying that every one was sick of hearing of the scheme, and wanted to see it carried into effect. What I should have least expected was that all readily understood that caravan trade would increase, and not decrease, when the line was built, owing to the fact that the lateral traffic from outlying villages to the main line would be greater than the present through transit trade" (p. 351). His own opinion of the opening up of the country by railway is expressed in his diary at Konia where he examines the social evils that have accompanied the railway thither. "It enabled the Turkish War Office to collect more men than it could

[1] See Fig. 1, p. 70 of this issue.—Ed. *S.G.M.*
[2] *The Nearer East*, p. 261.

deal with: it helped to drain Anatolia of inhabitants: it helps to increase the cost of living by drawing off the cereals and sending up the price of bread. Of course, this means more money: but it also means more poverty. The railway brings alcohol, dirty pictures, phonographs, and drinking saloons. Moreover, it produces a most horrible kind of greasy, grimy-faced, ragged, and unwholesome people, now well-paid employees, but formerly happy, wholesome peasants" (p. 522). Similarly at Ermenek, in the mountainous lands south of Konia, he writes: "I have no wish to labour this point, but I cannot deny the evidence of my eyes, and I know that if Ermenek were on the railway, there would be drink, noise, poverty, and dirt, flotsam and jetsam from the Mediterranean littoral, cadging and scavenging and corrupting. European speculators make good the bribes that they have spent in gaining concessions by squeezing the birthright of the peasants out of their very hands. Surely there is a big account which European civilisation will have to settle some day. To me it is a bitter thought that, sooner or later, these people will all be dressed in dingy clothes, all driven into mines and factories, all have to go into the ridiculous mill which begins with Manchester selfishness and struggle, passes through the stage of strife, and ends in utilitarian prosperity, where art, philosophy, and nature are no more" (p. 532).

These references to the evils that are inseparable from the spread of western civilisation are not confined to the railway. Throughout the diary there are frequent, almost despondent, records of the results of the labours of American missionaries, whose ideas of reform are the establishment of railways, factories, and the luxuries of Europe (pp. 357, 366, 383). At Damascus he sums up his complaint. "In fine, the world has lost: but in a sense Damascus has gained, since her people have been able to show in lasting materials that the combined efforts of the tourist, the American missionary, the French railway, and the cosmopolitan company promoter have not been able to crush their sense of beauty, to distort and deflect their view of proportion, or to annihilate their native genius" (p. 483).

It is the same on the Hejaz railway, the line that was laid for the commercially religious purpose of expediting and safeguarding the Moslem pilgrimage to Mecca. Sir Mark Sykes's indictment of the line, officials, and workers is thoroughly enlightening, if depressing and nauseating reading (pp. 471-80). The reader may draw his own conclusions as to the benefits of western civilisation on the virile peoples that gave the initial impetus to the Idea on which the Moslem world is based.

We have said enough to show the reader that the volume is of very great value and interest. It is a trite remark that there is not a dull page, but it is perfectly true of this volume. We may complain of lack of dates in the historical portion, or of the use of the Mohammedan calendar for readers who are not conversant with the date of the Hegira, but these cannot take away its interest from the volume, and scarcely impair its value. For the travel portion our praise is unstinted. The author is unprejudiced in his judgments, and it is refreshing to find descriptions and impressions that are as uncoloured by tradition as they

are frankly expressed. Add to these an easy style with first-rate descriptive powers, and the result is an informative and entertaining volume alike for the specialist and the general reader. There are a number of illustrations, and by the courtesy of the publishers we are able to reproduce two of these here. J. H. B.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Lectures in February.

Feb. 1. Dundee Centre.—Dr. Vaughan Cornish on "The Strategical Geography of the British Empire."
„ 2. Aberdeen Centre.—Do. do.
„ 22. Aberdeen Centre.—Professor J. Y. Simpson on "With the Russians in Galicia."
„ 23. Dundee Centre.—Do. do.
„ 24. Edinburgh.—Dr. William G. Black on "Heligoland and the North Frisian Islands."
„ 25. Glasgow Centre.—Do. do.

GEOGRAPHICAL NOTES.

Europe.

The Future of Poland.—One of the serious problems which the conclusion of the war will bring up for settlement is the question of the fate of Poland, and the extent to which that country can be reconstituted, presumably under Russia. A long article by M. Georges Bienaimé, in *La Géographie* for November last, discusses in some detail the conditions which obtain in the three segments of dismembered Poland, and considers the desirable frontiers of the new Poland which the author hopes is soon to be. The article is partly historical, partly political, and gives also many details about the percentage composition of the population in the areas where a Polish element exists. The initial proposition laid down is that though there is at present no Poland, the Poles form a solid block of twenty million persons, extending from the Baltic to the Carpathians, and from the Oder to the Niemen, meantime divided politically between Prussia, Austria, and Russia.

Prussian Poland forms the smallest of the three sections, but one of considerable historical importance. We need not stop here to consider the different partitions which have given rise to present conditions, but it is interesting to note that, according to M. Bienaimé, until some fifty years ago Prussian Poland was making rapid progress, and the Poles had much to learn from the German colonists. The German domination also was accepted peaceably, mixed marriages were not rare, and germanisation was making steady if not very striking progress. But

Bismarck's desire to germanise rapidly, "by fire and sword," changed all this, and the brutal suppression of Polish institutions and the attacks on Polish ideals aroused a corresponding fury of patriotism on the part of the Poles. The details of the conflict have often been described, and need not detain us here, though they are retold in the article clearly and vividly. The point of importance for the future is that the province of Posen has been the centre of Polish resistance, and therefore in the author's view, despite the considerable German population of the towns, must form part of a reconstituted Poland, in which the rights of the German minority should receive protection. West Prussia, he believes, should have the same fate, and this despite the fact that Danzig is a German town, in which the declared Poles constitute only 10 per cent. of the population. While admitting that East Prussia is in a somewhat different position, for Königsberg and its province are purely German, and two million Germans dwell between the mouths of the Niemen and the Vistula, he would include it also in the new Poland. In support of this position two arguments are advanced. In the first place, before 1772 the Prussia of Königsberg was isolated from the Prussia of Berlin and still prospered, why should it not come to reoccupy its old position? Second, M. Bienaimé believes that it is necessary for the peace of Europe to diminish the power of Prussia, and he holds that this can be done by the loss of East and West Prussia, as it could be done in no other way. The loss of Posen, East and West Prussia, would deprive the Prussian kingdom of 6,000,000 subjects, and bring the Slavs within measurable distance of Berlin. From Germany also he thinks Silesia, or at least Upper Silesia, should also be taken to be added to Poland.

The remainder of the paper must be treated more briefly. The author holds that the whole of Galicia should be attached to Poland, believing that it would be possible to provide for the rights of the Ruthenians there more effectively in this fashion than if Galicia were attached to Russia proper, which would possibly imply a loss of rights and liberties on the part of Poles, Ruthenians, and Jews alike. In Russian Poland a remarkable feature of recent years has been the gradual germanisation, which had made Lodz, before the war, practically a German town. The Germans were favoured by the administration at the expense of the Poles, a course whose dangers have now become apparent. A reconstituted Poland would, the author believes, form a barrier against which the Prussian wave would break in vain.

New Winter Route to Russia.—At the end of December last it was announced that a new steamer route had been established between Alexandrovsk, on Kola Bay, Russia, and Tromsö in Norway, a Norwegian steamer having made the journey under very favourable conditions. Alexandrovsk is situated far to the north of Archangel, but owing to its position, near the Norwegian frontier, it feels the influence of the Gulf Stream Drift, and, further, the rivers Kola and Tuloma bring to the bay a large amount of fresh water. In consequence the bay is open throughout the year, while Archangel, even when ice-breakers are used, is closed to navigation for several months every year. There has

been a Russian naval station at Alexandrovsk since 1899, but the absence of any railway connection with the interior has hitherto made it useless for commercial purposes. During the past year, however, the construction of the Murman railway, which links Kola Bay with Petrograd, has been pushed with great energy, despite most unfavourable country, and great climatic disadvantages. Its virtual completion was announced from Norway at the end of October last, though it is stated that it has been found impossible at present to construct a bridge between Kola and Alexandrovsk, which is on the west side of the fiord, so that meantime most of the business of the port will be done at Kola. The advantages of the new route are not limited to continuity of navigation throughout the year, for it has been found since the outbreak of war that the narrow-gauge railway between Archangel and the interior is wholly unable to carry the heavy traffic of the summer months; thus the new artery when open for traffic will be of great advantage to Russia, more especially under war conditions.

Economic Development of Bohemia.—Mr. V. Crkal has in the *Bulletin* of the Paris Society of Commercial Geography (issue dated July-Aug.-Sept. 1915) a short but instructive article on the economic development of Bohemia, which deserves special attention. The author notes that throughout the Middle Ages Bohemia had great commercial and industrial importance, both on account of its natural wealth and because of its central position. When the country passed under the rule of the Hapsburgs a rapid decline set in, and when commercial activity was re-established, it was to the profit of the German element not the Czech one. The towns and their activities were in the hands of the Germans, and the enslaved Czech peasants were for long powerless. When the peasants were freed in 1848, however, a change began. In the first place, a proportion of the country population migrated to the towns, which had till then been purely German, and distinctively Czech industries were established. At the same time strenuous efforts were made to liberate the peasants from the grasp of the money-lenders by the foundation of savings banks and similar institutions, and the development and organisation of the sugar industry soon brought prosperity. One result was to stimulate a demand for agricultural machinery, and thus to start a Czech iron industry. Though it was the Germans who first organised the sugar industry, yet there were also Czech factories, and the latter half of the nineteenth century saw the rise of a Czech middle class, a fact which has had both political and economic results.

During the period 1870-90, however, there was a distinct check to progress, partly due to the fact that Czech agriculture felt the competition of American produce very seriously, and as it was agriculture which supplied the funds for the industrial and commercial campaign against the German element, that campaign naturally suffered. But towards the end of 1890 a rise in price of agricultural produce took place, and capital began to flow into the various Czech financial institutions. Thenceforth progress was rapid, and this in spite of the fact that the

German element possessed the rich mines, and held all the best posts in connection with administration, and was favoured by the central authority as against the Czechs. Against German competition, however, says the author in a phrase which probably means much, one has to put the fact that "the Czech consumer is well organised, and up to a certain point disciplined." The result has been to add to the original sugar industry a well-developed iron industry, which has attained such dimensions that the production of agricultural machinery in Bohemia represents more than half of that of the whole of Austria. Among other industries are brewing, cotton manufacture, the working-up of agricultural raw material, printing and book illustration, the manufacture of china, and so forth. Technical education is also well developed. The net result has been that in the last twenty years Czech industry and commerce has made great progress, and the former purely political antagonism between German and Czech has been converted into an economic one. Mr. Crkal concludes by saying that the reconstruction of an independent kingdom of Bohemia will be one of the duties of the Allies at the conclusion of the war, and that this Bohemia will have before her a great future.

The Anthropology of the Balkan Peoples. — M. Eugène Pittard, of the Ethnographical Museum of Geneva, contributes to the *Revue Générale des Sciences* for December 15 an article on the peoples of the Balkan Peninsula from the point of view of anthropology. The article is based to a large extent on personal observations, an interesting feature, for direct observations on the inhabitants of the peninsula have not hitherto been numerous. M. Pittard does not regard his own investigations as sufficiently extensive to permit of positive deductions, and laments the fact that material in regard to the ancient peoples of the region is so scanty that it is practically impossible to determine what relation, if any, the present population bears to earlier ones. But speculation has hitherto been so rife, and has so often had a political bearing, that even the negative conclusions reached are of considerable importance. Before proceeding to consider these it must be emphasised that the paper is concerned wholly with physical characteristics, with race in the anthropological sense. The first point to notice is that from this standpoint no one of the peoples of the peninsula represents a pure race, and such evidence as is meantime available indicates, as indeed one would expect from the geographical conditions, that great intermingling of races has occurred. A general feature of all the peoples is the lofty stature. In the peninsula as a whole the mean height exceeds notably that of Europeans in general, and the people of Bosnia and Herzegovina come second to the Scots as the tallest people of Europe. The second general characteristic of the Balkan peoples is a moderate degree of round-headedness, the population as a whole being apparently sub-brachycephalic. No ethnic group as a whole is long-headed, but among the Bulgars a certain degree of dolichocephaly is frequent. While as yet it is impossible to distinguish in detail the strains which have gone to make up the present population of the peninsula, there seems evidence

to justify the belief that at least two primitive ethnic groups are represented—one characterised by tall stature and slight dolichocephaly, and the other by equally great height, but very marked brachycephaly. The Bulgaro-Serb groups belong to the first type, the Albanian group to the second. More in detail, it is interesting to note that M. Pittard's observations incline him to separate somewhat markedly the Bosnians and Herzegovinians, with which the Montenegrins should probably be associated, alike from the Croats and Slavonians which abut upon them to the north, and from the Serbs who form their eastern neighbours. The Bosnian group is characterised, as already stated, by very lofty stature, also by a high degree of brachycephaly, and by the possession of very dark hair and eyes. M. Pittard believes that the members of the group may be the descendants of the ancient Illyrians, and that a small number of the Albanians and of the Serbs may belong to the same race. As regards the Albanians, the small number of individuals examined leads him to the conclusion that the special feature is the small size of the head. The stature is somewhat lower than in the Bosnian group, the brachycephaly even more marked. But in view of the caution with which the author prefaces all his positive statements, it is perhaps better to end this brief abstract by repeating that as yet there is no evidence that any Balkan people represents a pure race. Further, the relation of the existing peoples to the earlier ones is in all cases obscure, so that the evidence, so far as it goes, is against the supposition that anthropology can give any assistance in the settlement of the difficult political problems of the peninsula, and therefore all arguments purporting to be based upon anthropological facts should be regarded with suspicion.

Asia.

Soil-Erosion in India.—Rain-wash, especially of lands which have been cleared of forest for cultivation, has attracted much attention of recent years in the United States, where the consequent diminished fertility of the land has often been pointed out. The same subject is also giving concern in India, and Mr. Albert Howard publishes a paper on the subject as *Bulletin* No. 53 of the Agricultural Research Institute, Pusa. (See also *Nature* for November 18.) In this paper Mr. Howard points out that in the hill tracts of Ceylon which were cleared of their forest cover for the sake of establishing coffee plantations, now replaced by tea, no provision was made for retaining the fine soil of the original forest *in situ*, and as a consequence the fertility and water-retaining power of the soils of the tea plantations have been much reduced, necessitating the expenditure of large sums on manures. Mr. Howard urges that where forest land is sold for agricultural use, a regulation that it must be immediately terraced should be enforced. As remedies against erosion and waterlogging in the alluvial tracts of peninsular India, he advocates embankments and surface drainage. A special method of drainage, whose aim is to retain the fine silt on the land, is described in detail.

AMERICA.

The Cactus Deserts of South America.—We have noted here repeatedly the investigations which have been made by the Carnegie Institution of Washington on the subject of Deserts generally, and especially on the cactuses of the Arizona desert. The scheme of investigation includes the study of the deserts of South America also, according to a paper read by Mr. J. N. Rose before the American National Academy of Sciences, and reported in *Science* for November 12, 1915. Considerable progress has already been made in studying the more important southern deserts. Those investigated so far include (1) the desert of western Argentina, which resembles in its component parts the deserts of Arizona; (2), the desert of central Brazil, composed of the western parts of the states of Bahia and Pernambuco; (3), the desert of Peru and Chile, comprising western Peru and northern Chile. The Brazilian desert proves to be very similar to the desert region of San Domingo, and the typical genera are nearly all West Indian, while the desert of Peru and Chile is the most distinct of those hitherto studied in South America.

Meteorological Extremes in the United States.—Mr. R. DeC. Ward, in a series of notes in the *Bulletin* of the American Geographical Society for December last on meteorological phenomena, draws attention among other matters to high temperatures in the States, and to areas of very heavy snowfall there. The highest temperature recorded at any definitely established station seems to be one of 134° F., observed at Greenland Ranch, on the edge of Death Valley, California, on July 10, 1913. Temperature records kept at this station during the period from spring 1911 to May 1915 show that 120° has been registered in May, June, July, and August. In the four years the mean of the monthly maximum temperatures has exceeded 100° from May to September every year except one, when the record was 95·4°. In the whole period considered, the temperature reached or exceeded 100° on 548 days.

As regards snowfall, it appears that the maximum in the States is reached in the high Sierra Nevada of California, especially along the line of the Southern Pacific Railway, which connects Sacramento and Reno. Over a considerable area here more than 100 inches of snow falls every winter. At Summit (7017 feet above sea level) a forty-four years' average gives an average seasonal snowfall of 419·6 inches, while at Tamarack (8000 feet) an eight years' average gives a fall of 521·3 inches. In the winter of 1879-80 no less than 783 inches of snow fell at Summit. The heavy falls here are not associated with high winds as in the case of some of the eastern mountains of the States. The effect of the heavy fall on railway travelling is considerable. The railway has thirty miles of snowsheds, and these cost on an average £150,000 per annum for renewal and upkeep. The danger of fire is so great that fire-fighting trains are kept in constant readiness both

summer and winter. Mr. Ward notes further that in the Cascade Mountains, close to the Canadian border, there is a small area where the mean annual snowfall reaches over 400 inches.

General.

Obituary.—In the *Annales de Géographie* for November 15 there appears a tragically long list of young French geographers who have lost their lives on the field of battle while fighting for their country. Among these we note Commander Joseph Vidal de la Blache, the son of Professor Vidal de la Blache, himself the author of an important monograph on the valley of the Meuse in Lorraine, and M. Gaston Gravier, an author who, young though he was, had already published numerous papers in the *Annales de Géographie* and elsewhere. M. Gravier, who was killed at Souchez on May 30 last, had held for some years a post at the University of Belgrade, and was notable not only for his excellent knowledge of the Serb language, but for his papers on various parts of the Balkan Peninsula, based upon extensive journeys in the region. In addition to his published works, M. Gravier has left behind a large amount of unpublished notes, and there seems hope that this material, which was in his house at Belgrade, may have escaped the bombardments of that ill-fated city. In addition to his strictly scientific work M. Gravier did much to increase the ties between France and Serbia, both by his influence at Belgrade University and by journalistic work. He is stated by Professor Demangeon, who contributes a sympathetic notice of his lifework, to have been one of the few Frenchmen who realised that the Eastern question would lead to a conflagration in the west, and believed that France would be obliged one day to fight for Serbia. His death in his twenty-ninth year is a great loss to geographical science.

Primitive Modes of Transport on Land.—In the *Bulletin* of the American Geographical Society for October last Dr. Michael Haltenberger publishes an interesting article entitled "Primitive Carriers in Land Transportation," which is illustrated by a series of illustrations taken from photographs of models in the United States National Museum. Some of these illustrations are very instructive, especially those which show the evolution of the wheel. It is suggested that rollers were first placed under sledge-like vehicles to diminish friction, and from these the first solid wheel was developed. As an intermediate stage examples are given of the rolling frameworks used by the Greeks to transport marble columns, and the curious tobacco-rolling hogsheads and rolling tar-barrels used in Virginia and North Carolina till the middle of last century. The development of the wheel is also traced from the first solid wheel, through the partially solid one to the modern type with spokes, and the change in the materials is noted, from wood alone, to a combination of wood and metal, and then to metal alone, sometimes combined with rubber. The figures of various forms of

wheeled vehicles are very striking, and as such illustrations are not always easy to obtain, teachers may be glad to have their attention called to them.

EDUCATIONAL.

Photographs of Geographical Interest.—It is perhaps not so widely known as it ought to be that the beautiful photographs taken by the Geological Survey in this country can be purchased, in this form, or as lantern slides, at a very moderate rate, from the Survey, and that these photographs are often of great geographical interest. The photographs are catalogued and indexed, and prints can be seen at the Geological Survey Office in Edinburgh, and also in the library of the Survey at London. But from an article in the *Bulletin* of the American Geographical Society for December last it appears that in the United States the various Government departments arrange in an even more systematic fashion to make their official photographs available for the use of teachers, and of members of the general public generally. In this article Mr. R. H. Whitbeck explains that the Forest Service has a collection of 30,000 photographs mounted, labelled, and classified, and in addition 70,000 negatives. The photographs are in charge of a special attendant at Washington who assists inquirers. The photographs can be purchased at an advance of 10 per cent. on the cost of printing, which makes the average price 6 to 15 cents, while lantern slides cost 40 cents. In addition, the Forest Service has loan collections of lantern slides, and also of mounted photographs, which are sent out to reliable persons or to institutions for short periods, the borrower being only required to pay transportation charges, and to make good any loss or damage. An exhibit of commercial woods grown in the States, with maps, charts, and other illustrative matter, is also sent out on loan. Similarly, the Reclamation Service has a large collection of photographs illustrating Government irrigation projects, and as well as supplying photographs and lantern slides, has also loan collections of lantern slides. The Geological Survey has a collection of 60,000 photographs, and these —an enormous advantage for teachers and others—are classified under subjects —as canyons, craters, caves, volcanoes, etc., and are mounted in albums which may be inspected by interested persons. The photographs can be purchased at a cheap rate. A special album, containing 400 views, illustrating nearly every type of geological and physiographical feature, has also been prepared, and is sent to persons desirous of purchasing 50 or more photographs, in order that a choice may be made. Photographs also may be ordered corresponding to the illustrations in any of the Survey's printed reports, and lantern slides are supplied. The Bureau of Mines has also a small collection of views both at the Washington and at the Pittsburg offices. Finally, Mr. Whitbeck points out that as copies of all copyright photographs must be deposited with the division of copyright, the U.S.A. Government has accumulated a very large collection of photographs. The best of these are classified

and stored in the Library of Congress, with the names of the owners, and copies may generally be obtained from the maker. It thus appears that teachers in the States are singularly well placed for obtaining both photographs of general geographical interest, and also illustrations of particular phenomena.

NEW BOOKS.

EUROPE.

Day by Day with the Russian Army, 1914-15. By Bernard Pares. London: Constable and Co., 1915. *Price* 7*s.* 6*d. net.*

"It was a delight to be with these splendid men. I never saw anything base all the while I was with the army. There was no drunkenness; every one was at his best, and it was the simplest and noblest atmosphere in which I have ever lived." Such is the testimony of Mr. Pares, official British observer with the Russian army in the field from July 1914 to June 1915. Mr. Pares had paid long visits to Russia during the ten years before the war, being interested in anything that might conduce to closer relations between Britain and Russia. In travelling through Germany to Russia he found that the German people "had an inborn unintelligence and contempt for all things Russian," and he often wondered whether Germany would fight Russia or Britain first. When Germany declared war on Russia he volunteered for service, and after a stay in Petrograd and Moscow was asked to take up the duty of official correspondent with the Russian army. He thus visited Galicia and Warsaw, and saw a good deal of the army. He was there allowed to join the Red Cross organisation with the third army, as an attaché to his old friend, M. Stakovich, who was at the head of the organisation. He retreated with the army to the San and to the Province of Lublin. The author gives a graphic description of the taking of Przemysl by the Russians in March last. "The greatest surprise of all," he says, "was the strength of the garrison, which numbered not 50,000 but 130,000, which makes of Przemysl a second Metz." He considers that "no kind of defence can be pleaded for the surrender of this imposing force." With regard to the war, he observes, "The one element in Austria that holds firm to the Prussian alliance is the Magyar; the one statesman in Austria is the Hungarian Count Tisza."

With the Russian Army. By R. B. M'Cormick. London: Macmillan and Co., 1915. *Price* 6*s. net.*

This interesting book, by the son of a former American ambassador to Russia, begins with searching pen-portraits of several leading British Cabinet ministers whom he met in London, and with the statement that "the bulk of the American nation is strongly pro-American, and is inclined to be critical of all the nations involved in the war." He went to the French front last February, and stood for an hour under shell fire at Arras. Afterwards he visited the British front, and dined with Sir John French. With regard to the original British expeditionary force he remarks: "Without a whimper, without a protest, it went to its destruction in the defence of the nation which had neglected it, just as our regular army must go some day unless, by the grace of God, we may learn preparedness in time."

From France he travelled to Petrograd *via* Athens, Salonika, Nish, Sofia, and Bucharest. He was presented to the Tsar at his palace, and noted that "he had

the largest eyes I have ever seen in living mortal." The Tsar told him, "The war was very sudden and very unexpected." He left for the Russian headquarters, and was introduced to General Yanouskevitz, chief of the staff, and then to the Grand Duke Nicholas, who "talked about the war, about the difficulty from the lack of railroads, and of the advantages which came from the simple style of living of the Russians whereby the men needed less equipment and commissariat than their adversaries." When at Warsaw he found ladies nursing the wounded in various hospitals, the largest hospital having six thousand beds, "as needs must when a single battle furnished 30,000 wounded Russians alone." After a visit to the Russian trenches he proceeded to Galicia. As he carried a camera he was able to take photographs which illustrate this book. He also took panoramic views by means of a cinema.

After giving a history of the Russian campaign, accompanied by maps, he adds several plans of modern fortifications, the result of special information received from Russian officers as a mark of friendship for the American people. He considers that such fortifications should be constructed throughout the United States, for, he says, "I take it as a matter generally admitted that in the event of war, if any military power should obtain command of the sea, it would be impossible to attempt to hold our sea-coast states. Our whole object would be to keep the hostile army from the centre of the nation during the years that it would take us to organise a sufficient force to retake the lost provinces, and buy arms and ammunition abroad."

Russia of To-day. By JOHN FOSTER FRASER. London: Cassell and Co., 1915. *Price* 6*s.*

The chief object which Mr. Fraser had in visiting Russia was, he says, "to look round and study the ways whereby the commercial relationship between Great Britain and Russia could be improved." In the past Russia has mainly bought goods from Germany. "The statistics of German trade with Russia during the last thirty years is a panorama of amazing progress." In the year before the war Germany exported to Russia thirty-seven million pounds' worth of goods, and Britain only nine millions' worth. The real cause of the German success and the British failure in Russian trade was that the Briton would neither adapt himself to Russian requirements, nor speak the Russian language, nor give long credit, all which things his German rival did. But Mr. Fraser thinks "there is going to be a greater trade with Russia and, if Englishmen want their full share, steps must be taken now, and not after the war, to have representatives in Russia who are Englishmen speaking Russian." He adds that "there is a happy British colony in Moscow, the Manchester of Russia. Wherever in Russia there is a manufacturing concern turning out engineering, cotton, woollen, or other goods requiring the use of modern machinery, there you are more likely than not to find some one from England or Scotland in charge." There are about 9000 British subjects in the Russian Empire, including thousands of English governesses.

"It is a punishable sin," the author says, "to speak German within the Russian Empire." To speak it is to be arrested and imprisoned. "It is, however, the keen ambition of every young Russian lad and girl to speak English. All through the winter of 1914-15 anybody who could give lessons in English was at a premium." Again, in Moscow, "Any one having a German name—and there are thousands—has a millstone about his neck. The Hotel Berlin changed into the Hotel d'Angleterre in a night. The Hotel Dresden ceased to be the Hotel Dresden by the simple expediency of censoring the name of the German town, but no substitute has been provided. It is the Hotel ——, which is an awkward

direction to the droshky driver." Mr. Fraser describes an interview he had with M. Timiriazeff, the ex-Minister of Commerce, whom he considers the greatest authority on Russian trade. Written in a lively and often humorous style, this well-illustrated book should commend itself to all desirous of drawing still closer the bonds with which the present war has united Russia and Britain.

AMERICA.

The North-West Amazons. Notes on some Months spent among Cannibal Tribes. By THOMAS WHIFFEN, F.R.G.S., F.R.A.I. London: Constable and Co., 1915. *Price* 12*s.* 6*d. net.*

We have lately been favoured with many books of a more or less sensational character dealing with the country of the Amazons, but in the present volume the reader will find no thrilling descriptions of the exploration of unknown rivers, no lurid details of atrocities in the Rubber Belt. Captain Whiffen gives us the results of a careful ethnological study of the little-known tribes who inhabit the forest region between the Putumayo or Issa and Japura rivers, the two great affluents which join the northern bank of the Amazon between Tabatinga and Teffe. He also made an attempt to follow the traces and ascertain the fate of the well-known French explorer, Eugene Robuchon, who disappeared on the Japura river in 1906. In this he was unsuccessful. In the introductory chapters the author draws an arresting picture of the conditions of travel in the Amazonian forest, and the terrible mental and physical depression induced in the explorer by his surroundings. "In truth there is nothing in Nature more cruel than the unconquered vegetation of a tropical South American forest. The Amazonian bush brings no consolation. It is silent, inhospitable, cynical. . . . Man is a very puny feature in the Amazonian cosmos."

To return to the main subject of the book. Captain Whiffen emphasises the remarkable isolation of the numerous tribes, some of whom are confined to an area no larger than an English parish, and their constant enmity with all their neighbours. This isolation gives rise to an extraordinary diversity of tongues. "Tribes divided by the breadth of a narrow river speak languages that are mutually unintelligible." He tabulates thirteen distinct languages spoken by twenty-one different tribes, of these some may number no more than a few hundred individuals. With two of the largest tribe-groups, the Witoto and the Boro, the author deals in detail, giving a full and most interesting description of the many strange customs of these primitive peoples—such as their ceremonial and "riddle" dances, and the "tobacco drinking" by which an agreement is ratified, or the vote given for the "ayes" or "noes" at the tribal councils. Most, if not all, of these tribes are cannibals, but their anthropophagy is confined to prisoners of war. Captain Whiffen suggests three reasons for this practice—first, as a system of vengeance, a method of inflicting the supreme insult on an enemy; secondly, the desire not to waste food material where animal food is scarce; and thirdly, but in a very subsidiary degree, belief in the assumption of the characteristics of the eaten by the eater. Geophagy, or the eating of clay, is also a common vice; it is possibly due to the absence of salt.

The Indians recognise two regnant powers, the Good and the Bad Spirit, who are supreme over lesser spirits of good and evil. Neva, the Good Spirit, made the world, but his attitude is entirely passive: once, however, he came to earth in the form of a man. In this legend Captain Whiffen sees the possibility of a perverted and far-travelled version of the Christian belief. On his relating the story of the Incarnation, the collective wisdom of the tribe replied through their chief, "that their people were greater than the white people, for the Good Spirit, Neva himself,

came to the Indians, whereas only the Young Chief visited the white people." The Bad Spirit is actively malevolent, and can take the form of a tiger or other fierce animal. Prayer to either Spirit is unknown, but the medicine-man uses magic against the Bad Spirit. The existence of the spirits of the dead is an accepted fact; the people also believe in a temporary transmigration of the disembodied soul into the form of some animal, with an ultimate arrival in the happy hunting-grounds of the Good Spirit.

The weapons, tools, etc., made by the Issa-Japura Indians are all of wood: they also possess ancestral stone axes, but the origin and history of these is entirely unknown. Pottery, made by the women, is beautifully symmetrical in form, and handsomely coloured with vegetable juices: it is bartered for other products with friendly tribes.

In conclusion, the author does not accept the view, advanced by some writers, that these Indians have reverted from a higher culture, or lost the knowledge of arts which they formerly possessed. He regards them rather as a primitive race, plunged at some unknown period into an environment which has arrested their development—in the forest there is neither stone nor metal—"a Neolithic people . . . or perhaps a people emerging from the unsettled conditions of the Palaeolithic hunter . . . and such they have remained throughout the centuries."

The book is illustrated with a number of excellent photographs of the natives: there are also maps and plans showing the author's route, and appendices dealing with the physical characters, language, and folk-songs of the Witoto and Boro tribes.

AUSTRALASIA.

My Recollections of Australia and Elsewhere, 1842-1914. By the Hon. John M. Creed, Member of the Legislative Council, N.S.W. London: H. Jenkins, 1915. *Price* 16*s. net.*

The author, who was born at Cirencester, England, in 1842, emigrated to Australia in 1861, but returned to London and entered University College as a student of medicine, and passed in 1866 the examinations of the R.C.S.L. and R.C.P.E. Then followed medical practice in Australia, after which he went as surgeon in charge of an expedition sent out by the Government of South Australia to explore the Northern Territory which had been added to that state. The natives of the country near Somerset were named the Gudang, now an extinct tribe. They were the only Australian natives who habitually used bows and arrows. Tobacco smoking was habitual among them even before the advent of Europeans, pipes and tobacco being obtained from New Guinea.

In 1872 the author was elected M.P. for the Upper Hunter district, but resumed medical practice at the dissolution in 1874. He lived at Scone, and among others met Mr. Armstrong, whose wife became the celebrated singer Melba. After fourteen years there of strenuous work as a doctor and J.P. he took up medical practice in Sydney in 1882 and edited the *Australasian Medical Gazette* till 1893. He was twice elected President of the N.S.W. branch of the British Medical Association, and initiated the legislation which requires a man to be registered and have his qualification proved before becoming a medical practitioner.

Re-entering Parliament in 1885 he advocated the improvement of the Defence of N.S.W. He describes the steps taken which led to the Federation of Australia in 1900. After discussing de Jode's Atlas of 1593 and giving from it a map showing a portion of Australia, he mentions that in 1853 near Gladstone on

the east coast of Queensland, a brass cannon inscribed "Santa Barbara 1596" was discovered. He states that the late Archduke Franz Ferdinand (murdered at Serajevo) visited Sydney about 1893 and "was a very distinguished naturalist and particularly interested in ornithology." The book is interesting as a description of life in Australia for many years past, by a man who united scientific observation with a successful medical and political career.

An Untamed Territory. The Northern Territory of Australia. By Elsie R. Masson. With Illustrations and Maps. London: Macmillan and Co., Ltd., 1915. *Price 6s.*

Following a much-copied custom the author might have entitled her book "My Darwin Year." She takes us to the northern territory of Australia in the cool season, and we accompany her through the wet months, until the cool season comes again. Her account must be of great interest to the Australian of the more temperate south, and especially to the Australian housewife, but it will also entertain readers at home. It is a vivid picture that she presents. Life in a tropical colony has its discomforts—its insects, lack of variety in flesh food, even its servant question—but there are compensations. Much of the territory is fertile, it is not devoid of valuable minerals, fish are abundant, and the climate, if reasonable care is exercised, is not unhealthy. One has, besides, the glorious feeling of being a pioneer whilst enjoying some of the comforts of civilisation. A brief description is given of the principal industries of the territory—pearl and turtle fishing, cattle-rearing, and even buffalo-hunting. The Chinese and native questions are touched upon, and the book ends with an account of the murder of a white man by blacks and the trial and punishment of the criminals. Other chapters relate a trip by motor-car, a voyage to the abandoned settlement at Port Essington, and to the head of navigation on the Roper River. The illustrations are good and the maps sufficient.

GENERAL.

Prehistoric Man and His Story: A Sketch of the History of Mankind from the Earliest Times. By Professor G. F. Scott Elliot. London: Seeley, Service and Co., 1915. *Price 7s. 6d. net.*

In his preface to this book Mr. Scott Elliot tells an interesting legend current among the Diequeno Indians of California, relating how the people had collected to listen to the Great Serpent, who had swallowed all learning. He was to teach them how to dance, but as they watched him enter through the roof, coil after coil, in an apparently endless series, they became alarmed at what seemed the limitless length of body and thus quantity of learning, and hastily set fire to the house and to him. The book has been written for the sake of those whose hearts similarly sink at the thought of the apparently indefinite amount of literature which must be plodded through before any clear conception of modern knowledge in regard to the early history of mankind can be gained. In other words, the author has attempted to give such a summarised account of the subject as may be acceptable to the ordinary intelligent reader. Professor Scott Elliot's extensive travels in the uncivilised parts of the world, his profound knowledge of botany and zoology and the other accessory sciences fit him admirably for the task he has attempted, and his book will be welcomed by a wide public.

Where so much detail is given we can only select a few of the more general points for comment. We note that Mr. Scott Elliot accepts the view that the cradle

of the human race was in Mesopotamia, the term being used in a much wider sense than is usual in geography. Further, he believes that it is to the long-headed Mediterranean race that humanity owes the first beginnings of agriculture, while most of the credit of first domesticating animals must go to the brachy-cephalic men of Asia. This latter type he believes to have originated near Turfan in Turkestan. In regard to the difficult question of the relation of the men of the Early Stone Age to later races, Professor Scott Elliot takes up a moderate position. Thus he does not believe that Neandertal man died out completely, as is often maintained, but considers that some of his traits can be traced to this day among the peoples of northern Europe. Cro-Magnon man he regards as the direct ancestor of the tall, fair, Nordic type, and as having had a common ancestor with Mediterranean man. The men of Solutré, again, he believes to have been the first brachycephalic immigrants into Europe from Asia, and the forerunners of the round-headed invaders of Europe in historic times.

These brief notes may serve to indicate the nature and interest of the book. We must add that it is copiously illustrated, some of the illustrations, especially the reproductions of prehistoric drawings, being exceedingly interesting. Finally, considering its size and the thoroughness with which the work of preparation has been done, the book is very cheap. It should be widely read, for the subject is one of universal interest.

Cities in Evolution. By PATRICK GEDDES. London: Williams and Norgate, 1915. *Price 7s. 6d. net.*

This is a book on a very important subject, which ought to interest every citizen and especially all who take a share in the government of city or town; it is written by a man who is, as far as Scotland is concerned, the foremost advocate for the remodelling of the laying out of cities, and who therefore has a right to be heard. It is therefore a misfortune that Professor Geddes has so much spoiled the power for good which his book ought to have by two apparent faults which a man of his ability ought to have avoided. In the first place, the language in which a great portion of the book is written can scarcely be said to be English. The first hundred pages especially contain a bad imitation of the style of Thomas Carlyle; it is full of words coined by Mr. Geddes, ugly words which hurt the reader's eyes. The men who need most a book on the planning of cities, towns and villages are certainly those who form the councils of towns and counties, and they can have no sympathy with words coming from the Greek. Even if they take the trouble to turn up such words in a *Twentieth Century Dictionary*, they are not likely to find a translation of them there. How many plain men are likely to read a chapter headed "Paleotechnic and Neotechnic"?

A second fault is the number of pages devoted to matters which interest Mr. Geddes, but which he has no right to expect the general public to care about at all. The longest chapter in the book is given up to the town-planning exhibit in the Ghent Exhibition of 1913. What possible interest can the ordinary citizen take in a section of an Exhibition which is already totally forgotten?

The ordinary man, who does not belong to any cult, and who goes to this book seeking honestly for information, will probably get more instruction from the illustrations than from the letterpress. The book is very well illustrated, and many of the views give the desired information clearly and simply, and from these, better than from the text, the citizen will gather the opinions which Mr. Geddes desires to inculcate. The intention of the book will appeal to all who desire to sweeten our town-life, and especially the life of the poor of our great cities. Mr.

Geddes advocates broader streets, and more open spaces. He desires to limit the number of people to the acre, and to spread the population so as to give it more light and purer air to breath. He advocates that the corporations should lay out the ground on which houses are to be built, instead of every proprietor of a patch building as he chooses. He would like to see the people of the great towns lodged in cottages with gardens instead of in towering tenements. With all these desires the reader will heartily agree. But this book does not assist in an adequate manner the town councillor who sets himself to carry into practice the reformation of the old portion of a historical city or the laying out of the new portion of a growing town. There are three classes of workers who need counsel and advice. The architect who lays out the plans of ground and of houses. There follows the burgh engineer, who must construct a scientific system of drainage, and who must watch that the drains inside and outside the houses are honestly built. And as necessary is the work of the burgh treasurer, who should take care that the improvement of the burgh does not entail on the ratepayers a burden of rates hard to bear. In chapter x. Mr. Geddes refers in passing to the manner in which Haussmann remodelled Paris fifty years ago. It is well to note that this great improvement scheme of fifty years ago is largely responsible for the present weight of rates in Paris, and for the octroi duties which make the food of the poor so dear. It is not good to buy amenity with the food of the people.

In one of the later chapters, Professor Geddes treats his readers to a really charming sketch of Chelsea, and brings out most pleasantly some of the quaint corners of that interesting old town beside the Thames. The little picture shows that the author can write English when he is not trying to be impressive.

The Birth-Time of the World and Other Scientific Essays. By J. Joly. London: T. Fisher Unwin, 1915. *Price* 10*s.* 6*d. net.*

The Earth: Its Life and Death. By A. Berget. Translated by E. W. Barlow. London: G. P. Putnam's Sons, 1915. *Price* 7*s.* 6*d. net.*

Professor Joly is Professor of Geology at the University of Dublin, and is as eminent a physicist as geologist; hence his opinion is of especial value on problems where geology and physics overlap; and this collection of his interesting and suggestive essays will be useful, as it will lead students who read one to read the rest. Among the varied contents of the volume is a discussion why Alpine flowers and plants which have grown in Norway or at high levels in the Alps are more vividly coloured than members of the same species grown in lower latitudes or levels. In discussing the abundance of life the author lays stress on the distinction between organic and inorganic bodies based on the growth of crystals forming stable material and involving the loss of energy, whereas the growth of an organism produces unstable material and increased energy. But though this distinction may have carried weight when the essay was published in 1890, it has surely gone the way of all other attempts to distinguish between the vital and the non-vital, since there is no difference in respect either of stability or energy between organically and inorganically formed carbohydrates. Among the articles of most geographical interest is that on the Birth-Time of the World. The title is not precisely descriptive, as the essay deals with the age of the world and does not describe the time of its birth; it re-discusses the conflicting evidence given by denudation, the rate of formation of sedimentary rocks, the saltness of the sea, and radio-activity. The results vary from 13 million years to 11,470 million years; the longest estimate is nearly a thousand times as generous as the shortest. Professor Joly is the author of the most serious attempt to measure the age of the

earth by the saltness of the sea, a method which Professor Berget in the second work noticed dismisses as unreliable. Professor Joly assumes that the sea was originally fresh, an assumption rejected by Berget. Professor Joly obtained from the amount of salt in the sea a life for the earth insignificant compared with that given him by radio-active evidence. It is interesting to note that he is now disposed to question the radio-active method, though in the recent discussion on the subject at Manchester Sir Ernest Rutherford held that it is more reliable than the geological.

The two articles on Alpine structure and mountain genesis adopt the most extreme views as to Alpine overfolding, and attribute the formation of mountains to the weakening of belts of the earth's crust by the overheating of areas which have been depressed by a heavy load of sediment. The author's protests against the supposed rigidity of the earth's crust should be useful. The essay on skating proves that pastime to depend upon the same process of ice-melting under pressure as causes the flow of glaciers. The chapter on pleochroic haloes is used to show the prolonged stability of the chemical elements. One of the most serious drawbacks of the book is that though intended as a popular explanation of scientific problems it introduces physical conceptions which are either unexplained or are explained in metric measurements that will help further to bewilder the ordinary reader. The book would probably have gained much in usefulness if its measurements had been given in the more familiar and often more convenient British units.

In this respect the translation of Professor Berget's *The Earth: Its Life and Death* sets a good example; for the French measurements are accompanied by British equivalents. Professor Berget himself may regard this as unnecessary since he remarks that the metre "is now adopted by all civilised countries" (p. 61). The translation of the metric measurements will help his book to be useful to the uncivilised English-speaking races whose units of length are still spreading quietly in the practical business of the world, and who remember that the metre adopted by the German customs is not the same length as the French, and is based on the British inch. Professor Berget's book consists of a series of twelve chapters describing the history of the earth and those complex movements, variations, and activities which the author claims give the earth a distinctive life of its own. The translation is excellent, and there are many useful notes and explanations which bring the work up to date and prevent misconceptions of some sentences in the original. There are a few misspellings—Stephenson instead of Stevenson—and the description of a glacier as a "frozen river" instead of as a river of ice might be modified. The South Polar cyclone, though still adopted in the text, has now been definitely disproved.

The most valuable chapters in the book are those dealing with recent researches on the distribution of gravity, on the varied pulsations of the earth's crust, and on the deviation of the vertical. The author is emphatic that the earth is slowly contracting and has a rigid crust over a plastic interior. He therefore adopts the tetrahedral theory of the distribution of land and water, and claims it as an inevitable consequence of the slow contraction of the earth; he shows how proved anomalies in the distribution of gravity are explained by the tetrahedral deformation of the crust. Thus he quotes Lallemand's interpretation of the anomalies in gravity that have been proved by Hecker near Berlin as due to that area being near one of the tetrahedral elevations. Professor Berget is emphatic that the earth as a whole has at least the rigidity of steel; but he shows that there is no inconsistency between that condition and the plastic nature of the subcrustal material. He attributes many phenomena to tidal disturbance of the crust; thus he ascribes

the eruption of Mont Pelée to "internal tides forming a wave at the upper liquid surface of the central magma." The view that the earth's crust is undergoing frequent slow movements of elevation and depression he claims as proved, amongst other evidence, by peaks once visible from a point having disappeared either by their sinking or by the rise of some intervening hill; and he says this fact has already been demonstrated in the Juras, Bohemia, Spain, Switzerland, and Thuringia.

The author explains many important researches on physical geography which are apt to escape general notice; thus, amongst others he refers to the interesting results obtained by Eötvös with his unifilar pendulum. He gives a useful summary of the conclusions as to terrestrial magnetism in the seventh century B.C., deduced by Folgheraiter from Etruscan vases; and the conclusions of that Italian investigator have been supported by those of Bruhnes on the magnetism of baked clays associated with the volcanic rocks of central France. In his account of crustal radio-activity he attributes the medical value of some mineral waters when they are drunk fresh from the spring to evanescent radio-active constituents.

Professor Berget's volume is written with a full knowledge of recent work on the physics of the earth's crust, and his lucid account of many recent investigations should be of great value to non-mathematical geographers.

The New Empire Partnership. By PERCY and ARCHIBALD HURD. London: John Murray, 1915. *Price 6s. net.*

The authors expose the fallacies, which were once common, of opposition to a strong navy and to the manufacture of munitions of war. They remind us that, when the present war broke out, our safety depended on the eight Dreadnoughts which Mr. M'Kenna secured in 1909, and for which he was held up to execration as a traitor to economic principles. They contend that as the British Empire lives on and by the sea, it must be defended principally on and by the sea, if at all. While the British Empire is the most marvellous creation of which history has any record, we often, they say, go on our way careless of the future. They insist that "a new age is opening. We must organise Imperially if we are to hold our own in the novel conditions which are coming into view." The authors discuss these conditions in an elaborate historical review and protest against such a title as "Home Fleet," maintaining that "the British Empire depends upon a general supremacy of the seas and not upon the presence of isolated ships here and there to minister to the pride and sense of importance, or a false feeling of security, of small communities." They would substitute the words "Grand Fleet," a title usually employed by Admiral Sir John Jellicoe, although the Admiralty still refers to "Home Fleets."

Turning to the armies of the Empire, the authors point out that "the Great War has shown the unrivalled material the British Empire possesses; all that is necessary is training in peace so as to enable the British peoples to share, to the extent of their will and resources, in the defence of the Empire as a whole." Then follow observations on commerce and on the expectations of German theorists that a great war would destroy the British policy of world dominion. On the contrary, "participation in the greatest conflict of the ages has left the economic relations of the British Empire almost unruffled, strengthened indeed, rather than weakened." At the same time, "in commerce, as in policy, we can never revert to the position in which we stood before the fateful day, 4th August 1914." The old Budgets of £200,000,000 a year will be swollen to £400,000,000. "This is an Empire War. It is the first war in which the peoples of the British Empire in every stage of development have stood together in partnership." Consequently,

"this being an Empire War, the Peace, when it comes, must be an Empire Peace. The recognition of partnership which the Dominions demand they will assuredly receive." The authors conclude a stirring work by insisting that "a far closer and far more real co-operative relationship must be established between the States of the Empire, covering defence, commerce, tariffs, foreign policy, treaties, and all matters in which they have a mutual concern. A great charge is laid upon us, and, remembering our past, we dare not fail in it."

Between the Lines. By Boyd Cable. London: Smith, Elder and Co., 1915. *Price 5s. net.*

This book is made up of a series of singularly vivid pictures of the actual fighting in the present war and of life as it presents itself to the soldier in the trenches. Mr. Boyd Cable states in his brief foreword that the whole of his book has been written at the Front, within sound of the German guns, and, for the most part, within shell and rifle range. Each chapter has for its heading an extract or quotation from one of the official despatches; *e.g.*, "a violent artillery bombardment has been in progress," or "a section of advanced trench changed hands several times, finally remaining in our possession," and the author's aim is to convey to the reader an idea of what actually lies behind these and other such curt official announcements. The result is a book of enthralling interest which few will be able to lay down without reading it from cover to cover. If we may single out any special chapters, where all are so excellent, we should mention "The Advance," "The Mine," and "The Promise of Spring."

The Wizard Gillie and other Tales. Edited and translated by J. G. Mackay. London: Saint Catherine Press, 1914. *Price 2s. 6d.*

This little volume contains ten folklore tales selected from the MSS. Collection of the late J. F. Campbell of Islay. Mr. Campbell, during his life-time, published in four volumes his *Popular Tales of the West Highlands*, but in addition to these he left a large collection in manuscript, which is stored in the Advocates' Library, and out of this latter collection Mr. Mackay has edited and translated ten. Mr. Campbell made one of the most important contributions ever made by any scholar to the scientific study of folk-tales, and readers interested in the subject will feel indebted to Mr. Mackay for unearthing these stories, giving a good translation of them, and adding valuable notes. The book is altogether very attractive, and one can only hope that he will be sufficiently encouraged by the circulation of this volume to edit and translate many more of Mr. Campbell's collection.

BOOKS RECEIVED.

Perfumes of Araby. Silhouettes of Al Yemen. By Harold Jacob. Demy 8vo. Pp. 264. *Price 7s. 6d.* London: Martin Secker, 1915.

South-West Africa during the German Occupation, 1884-1914. By Albert F. Calvert, F.C.S. 232 Plates. Crown 8vo. Pp. xxxii + 105. *Price 5s. net.* London: J. Werner Laurie, 1915.

The Red Indians of the Plains. Thirty Years' Missionary Experience in the Saskatchewan. By the Rev. J. Hines. With a Preface by the Rev. H. E. Fox. With 22 Illustrations and 2 Maps. Demy 8vo. Pp. 322. *Price 6s. net.* London: Society for Promoting Christian Knowledge, 1915.

Poland: A Study in National Idealism. By Monica M. Gardner. Crown 8vo. Pp. xii + 244. *Price 3s. 6d. net.* London: Burns and Oates, Ltd., 1915.

The Americas (Beginners' Regional Geography). By J. B. Reynolds, B.A. Crown 8vo. Pp. 64. *Price* 1*s.* London: A. and C. Black, Ltd., 1915.

Hazell's Annual for the Year 1916. Edited by T. A. Ingram, M.A., LL.D. Crown 8vo. Pp. lxxi+528. *Price* 3*s.* 6*d. net.* London: Hazell, Watson and Viney, Ltd., 1916.

Sweden: Historical and Statistical Handbook. By order of the Swedish Government. Edited by J. Guinehard. 2nd Edition. English Issue. Demy 8vo. Pp. vol. I. xxvi+781, vol. II. xi+758. Stockholm, 1914.

Guide to South and East Africa. Edited annually by A. Samler Brown, F.R.M.S., and G. Gordon Brown, F.R.G.S. Crown 8vo. Pp. lii+772. *Price* 1*s.* London: Sampson Low, Marston and Co., Ltd., 1916.

The Growth of a Scottish Burgh. A Study in the Early History of Dumfries. By G. W. Shirley, F.L.A. Demy 8vo. Pp. 52. Dumfries, 1915.

Cathay and the Way Thither: Being a Collection of Mediæval Notices of China. Translated and Edited by Colonel Sir Henry Yule, R.E., C.B., K.C.S.I. New Edition. Revised throughout in the light of recent discoveries by Henri Cordier, D.Litt., Hon. M.R.A.S. Volume I. Demy 8vo. Pp. xxiv+318. London: The Hakluyt Society, 1915.

An Irishwoman in China. By Mrs. De Burgh Daly. Illustrated. Demy 8vo. Pp. xi+295. *Price* 10*s.* 6*d. net.* London: T. Werner Laurie, Ltd., 1916.

Walker of Tinnevelly. By Amy Wilson-Carmichael. With Portraits. Demy 8vo. Pp. xviii+458. *Price* 6*s. net.* London: Morgan and Scott, Ltd., 1916.

Civilization and Climate. By Ellsworth Huntington. Royal 8vo. Pp. xii+333. *Price* 10*s.* 6*d. net.* London: Humphrey Milford, 1915.

My Holidays on Inland Waterways: 2000 *miles Cruising by Motor Boat and Pleasure Skiff on the Canals and Rivers of Great Britain.* By P. Bonthron. With 74 Illustrations and Map. Demy 8vo. Pp. xvii+186. *Price* 4*s.* 6*d. net.* London: Thomas Murby and Co., 1916.

Who's Who, 1916. Crown 8vo. Pp. 2451. London, 1915.

Burma Gazetteer. Henzada District. Rangoon, 1915.

Agra and Oudh Gazetteer. Ghazipur District. Allahabad, 1915.

Central Provinces Gazetteer. Hoshangabad and Jubbulpore Districts. Bombay, 1915.

Bengal District Gazetteers. 9 Volumes. Patna, 1913.

British Guiana. Blue Book, 1914-1915. Georgetown, 1915.

Statistical Abstract for the United Kingdom, 1900-1914. London, 1915.

Official Year Book of the Commonwealth of Australia, 1901-1914. By J. H. Knibbs, C.M.G. Melbourne, 1915.

Catalogue of the Fresh Water Fishes of Africa in the British Museum. Vol. III. By George Albert Boulenger, F.R.S. London, 1915.

A Guide to the Fossil Remains of Man in the Department of Geology and Palæontology in the British Museum (Natural History). London, 1915.

Sudan Almanac, 1916. London, 1915.

Diplomatic and Consular Reports.—Spanish Possessions in the Gulf of Guinea (5519); Bordeaux (5525); New Caledonia (5533); Nagasaki (5535); Oporto (5536); The Cyclades (5537); Saigon (5538); Seistan and Kain (5539); Oregon, Washington, Idaho and Montana, and the territory of Alaska (5540); Mengtzu (5541); Chefoo (5547).

Colonial Reports.—Barbados (871); Falkland Islands (872).

Publishers forwarding books for review will greatly oblige by marking the price *in clear figures, especially in the case of foreign books.*

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE RESOURCES OF CANADA.

By H. M. Cadell, B.Sc., F.R.S.E., D.L.

(With Sketch-Maps and Illustrations.)

At a time when the whole resources of the British Empire, both moral and material, are being strained to the utmost to uphold a noble heritage and help the Allied States, it is the duty of all true Britons to think imperially, to look round, examine our heritage in every corner, find out what our natural potentialities may be, tap new fountains of wealth if they can be found, and above all things avoid wasting the precious resources we already possess. The geographer can here render useful help to the imperial economist and the statesman looking anxiously after the sinews of war. Without attempting to compile a complete record of all the available resources of the Empire, much use can be made of the materials already in existence in the shape of official reports, dry papers, and original articles hidden away in magazines on the shelves of geographical societies, which only a microscopic section of the intelligent public ever wishes to consult or study.

The investigation can only be made piecemeal, and the natural way is to begin at home, and then sweep outwards over a wider horizon. But the natural resources of the United Kingdom need no recapitulation. They are already well developed and less capable of expansion than those of the Dominions across the sea, and it is more useful here to go afield at once and explore the natural capabilities of newer countries. Where can we make a better start than in the fair dominion of Canada—the Land of the Maple Leaf whose brave and loyal sons have already shed torrents of blood for King and Empire, the land nearest the heart of the old country both geographically and from the sentimental point of view!

There already exists a huge and constantly growing mass of literature on the resources of the Dominion, much of it in the nature of

advertisement, no doubt, which requires considerable sifting to separate the wheat from the chaff. I had the advantage of visiting Canada in 1913, under the guidance of the Geological Survey and Mines Department, and travelled from Nova Scotia westwards to Vancouver, and then up the coast to Alaska and Dawson City in the Yukon gold district. In a three months' tour I was thus able to see as much under good leadership as enabled me to grasp mentally the main characteristics of the habitable parts of the country and form some idea of its resources and potentialities.

During the progress of the war the Commission of Conservation of Canada has been carrying on its excellent work, and the Sixth Annual Report of its proceedings was published at Ottawa in April 1915. Professor Frank D. Adams of M'Gill University, Montreal, has for many years done valuable work on the Commission and on a variety of other fields both Canadian and patriotic. His public services deserve grateful recognition here, and in his Presidential Address before the Royal Society of Canada in 1914, on "The National Domain in Canada and its Proper Conservation" he makes numerous wise suggestions, and summarises many important points which may with advantage be further considered and discussed.

The natural resources of Canada may be broadly classified under four heads :—

1. Animal (including Fisheries and the Fur Trade).
2. Vegetable (including Agriculture and Timber production).
3. Mineral (Mining and Metallurgy).
4. Hydrodynamical (Water power).

1. Animal Resources.

The Fur Trade.

The famous Hudson's Bay Company, founded in the reign of King Charles II. in 1670, of which Prince Rupert was the first President, was the means of originally discovering most of Canada to Europeans. It had a great share in the opening up of the unexplored interior and making the Dominion known primarily as a happy hunting-ground full of wild animals with good skins and fur. The hunting and trapping, with the help of the Indians, has gone on uninterruptedly for nearly two centuries and a half, until now furry animals and big game have been greatly reduced in number, and some species, including the buffalo, have been nearly exterminated.

Hudson's Bay Company still lives and flourishes, but it has been wise enough to enlarge its scope and extend its enterprise. Long ago it prudently acquired large blocks of unoccupied land near rising towns, which it holds or sells with advantage as the value of real estate increases and population continues to grow. The export of furs has been greatly affected by the war, which has practically closed, during the hostilities, the great markets in Leipzig and Nijni Novgorod, and has largely reduced the sales in London, but in 1913 the value of furs exported from Canada

exceeded a million sterling. The fur traders have been pushing ever further afield armed with the best kinds of guns, baits, and alluring scents, but in spite of this the supply of furs is steadily diminishing, and the prices continue to rise as extermination proceeds. No doubt the war will have an immediate effect on this industry, especially in the belligerent countries, where for many years expensive fur coats will have to give place to less costly raiment, but in rich neutral countries like the United States, to which the war has brought increased prosperity and no distress, the fur market may be greatly improved. The mere fact that a thing is scarce and dear creates in some minds an inextinguishable desire to possess it, and when the means to buy are present, the price will not stand long in the way of business.

There is much in a name, especially in the fur trade, and on the way to market many skins change into more aristocratic families than those of their plebeian childhood. The change of name is not publicly reported to the buyer, and the higher price is charged him for the title that has been conferred on the journey. According to Dr. Adams,

Goats	are changed into	bears,
Hares or minks	,,	sables,
White rabbits	,,	ermine,
White hares	,,	chinchilla,
Raccoons	,,	silver bears.

The hunting, and especially the trapping, of wild animals is attended with enormous cruelty. It is not sport at all, and the wretched creatures are often held for hours or days in the traps with maimed and crushed limbs to die in slow agony or starvation, or be torn in pieces by some other animal, before the trapper arrives to put an end to their misery.

Fox Ranches.—In these circumstances it is not difficult to see how the artificial breeding of fur animals has become an interesting and important industry, one that is more humane than trapping and hunting and is capable of great development. The prices obtainable for pelts of certain species bred in modified captivity are better than for those obtained from the forest. During the last few years the prices of furs have risen enormously. For example, mink valued at $2.58 in 1900 was selling in 1910 for $6.34. Red fox in the same decade rose from $9 to $16, and lynx from $10.8 to $39.85.

The fur-farming industry requires a suitable climate and habitat, and this is to be found to perfection in some parts of Canada, where the winter is cold enough and the other conditions are entirely favourable. Fox farming, which was originated in Prince Edward Island in 1887 by Robert Oulton, who was joined by Charles Dalton in 1896, has been mainly confined to that island, where in August 1914 there were between 250 and 300 fox ranches containing 4587 foxes, 1602 of which were silver foxes. The estimated value of these was $20,000,000[1] or £4,000,000. A good black fox skin rarely sold for less than £100 before the war, and often brought as much as £400 at the London auction

[1] *Heaton's Annual*, 1916, p. 377.

sales. It is to be hoped such extravagance in the fur department will be considerably modified when the necessity of the simpler life becomes more apparent, even though Canadian purveyors of luxury should feel the effect.

When fox farming, which was originally a private and very exclusive branch of industry, was found to be so profitable, the inevitable speculation was set on foot. The price paid for a pair of fox ancestors to found the family on a ranch was £500 or £600 in 1910, but it rose in 1913 to between $12,000 and $17,000, or £3400. Much skill and great knowledge of the habits of these undomesticated animals is required to rear them successfully.

The speculators, who appeared on the scene after the pioneers had

View from Sulphur Mountain, National Park, Banff.

established their success, did much to discredit the industry, but there can be no doubt that good fur-bearing animals, such as the fox, mink, marten, fisher, Russian sable, beaver, muskrat, raccoon, and skunk, can be successfully bred in captivity, and this is one of Canada's resources that is capable of great expansion.

Sanctuaries for native animals.—To prevent their total extinction the government have wisely appropriated large tracts of unoccupied land reserved as public parks and sanctuaries for the native wild animals. One of these is the magnificent National Park at Banff in the Rocky Mountains, 5732 square miles in extent, where the original denizens of the forest can live and die in perfect peace and security. In these places they soon multiply and lose their shyness when they feel safe and undisturbed by human foes. I was amused one day by a bright-eyed squirrel that ran out of the forest and gambolled playfully round my seat at a lovely viewpoint on the top of a mountain near Banff, and then climbed

nimbly up and looked over my shoulder to inspect the progress of the sketch I was making, in a way I am sure no European squirrel would ever have thought of doing.

Fisheries.

Sea Fishing.—The long coastlines on the cold northern oceans, inhabited by immense quantities of fish of high quality, give Canada's fisheries a far more important industrial position than her fur trade. Canada ranks fifth among the nations of the world in the yield of its fisheries, in which some 90,000 men are employed. The value of the fish taken annually is between 26 and 33 million dollars, or roughly from 5 to 6½ millions sterling. The older fisheries of the Maritime Provinces on the Atlantic coast were the first to be developed, and were the most important up till 1912, when the rapidly increasing fisheries of the Pacific coast passed them for the first time in the upward race.

Atlantic Fisheries.—The fish taken on the Atlantic coast are mainly cod, haddock, hake, and halibut, and the sheltered bays and mouths of the great rivers, especially the St. Lawrence, provide vast breeding-grounds, closed by ice in the winter and spring during the spawning season. The northern ocean currents bring abundance of food to the off-shore banks, on which the fish spend most of their existence, and there is no sign of any diminution in the supply. With the improved methods of curing and canning the fish for market that are being introduced by government, the industry should continue to prosper and maintain a hardy and industrious population, who can live on their land, and supplement their bare agricultural earnings by their more lucrative work on the sea.

Whaling.—While there may be as many good fish in the sea as ever came out of it, the same proverb cannot be applied to the whales on the Atlantic coast. Like the big game ashore, they are becoming scarcer and more difficult to catch. The whales that once were abundant as far south as the New England coast have all been killed off, and the whaling grounds are now restricted to Davis Strait, Baffin Island, and the northern parts of Hudson Bay. Both Scottish and American whalers used to reap an immense harvest there, and up till 1878 as many as one hundred and ninety whales were sometimes killed in a season. The result of this ruthless slaughter has been the extermination of nearly all these huge animals, only twelve of which were taken in 1904. The increasing price of whalebone has raised the price to such an extent that a single whale brought his slayers as much as £3000 to £4000.

Extermination of Whales.—The whalers have destroyed their own trade, and in 1909 it was reported that only three whales had been caught in the Arctic Sea. What is wanted now is a legally enacted close time of ten or fifteen years, to give the poor whales a chance to live and multiply again, or perhaps to declare part of the ocean a sanctuary, as has been done by the Canadian government for the big game on shore. It would, however, be more costly and difficult to protect the whales against poachers than to protect the bears and buffaloes,

but with spare naval units available after the present hostilities are over, the matter might be worth imperial consideration.

After exterminating the whales on the Atlantic coast the American whaling fleet went to the Pacific, and beginning at the coast of Chili crept northwards, killing off all the whales in one district after another, until they reached the coast of Kamchatka and the Sea of Okhotsk. Then they went northwards through the Bering Strait into the Arctic Ocean, and that has in recent years been the best whaling ground, but it also has been greatly depleted by the Americans.

Walrus Hunting.—The same process of destruction has been carried on against the walrus, whose value to the Esquimos is far greater than to the more civilised peoples. The value of their blubber and tusks is small, and the entire value of a large walrus is less than £10, while the difficulty of securing one that has been killed is great. It has been well suggested by Commander Low, in the *Voyage of the Neptune*, that regulations should be passed reserving this animal entirely for the Esquimos, who, it should not be forgotten, are humble and inoffensive British subjects, well accustomed to the simple life, and in need of the means of making a decent livelihood quite as much as their more opulent neighbours in the temperate zone.

Pacific Coast Fishings.—The conditions on the warmer coast of British Columbia differ greatly from those of the Atlantic fisheries. Here the salmon is by far the most important fish, and prodigious shoals come up the rivers to spawn, and are very easily caught. I have seen the bed of a small river with less than a foot of water in it almost black with a seething mass of salmon struggling up to the higher reaches, and it was quite easy to lift them out in dozens from the shallows where they were stranded.

Over-Fishing.—The value of the salmon catch has enormously increased in recent years, and is now over £2,000,000. Year by year the canneries and the cold storage plants are growing in number and size. The boats are also multiplying, and a regular barricade of nets has been stretched across the mouth of the Fraser River. The effect of this vast industry is bound to be felt by the fish, and it has been already ascertained that the supply is gradually diminishing. The canners know this, but still continue to extend their plants, and so contribute to the destruction of their own business.

Up till 1908 more salmon were caught by the Canadian than by the American canners, but now the United States fishermen catch twice as many as the Canadians. The fish coming from the sea to spawn in the Fraser River pass through the south end of the Strait of Georgia, which separates Canadian from American territory, and are caught there in enormous quantities by the Americans. The conservation of the industry is therefore an international question of some importance, and should be discussed by the respective governments with a view to preventing the destruction of a great industry. Such a thing is known in the West of Scotland as the desertion of some good fishing sea lochs by the herring. The run varies greatly from year to year, and possibly the salmon, like the herrings, might one day decide to avoid entirely a spot

that has become a death-trap to so many of their race, and what would the canners do then with all their prodigious plants?

But the Pacific coast fisheries are not confined to salmon on the Fraser River. Vast fleets come across from Japan and the Asiatic coast to fish in the adjacent sea. The new town of Prince Rupert, at the end of the New Grand Trunk Pacific Railway, 500 miles north of Vancouver, may one day become a great fish emporium. Numerous canneries have been established along the adjoining coast, and a huge cold storage building six stories in height has been erected, in which, by artificially made ice, the fish can be preserved for a long time, or sent off directly, packed in ice, to distant markets in Canada and the United States. The principal kinds of fish caught here are salmon, herrings, and halibut, with smaller quantities of many other species.

Oyster and Lobster Fisheries.—Although less important than the deep-sea fisheries, the oyster grounds off the Atlantic coast produce oysters of the best quality, but, like the big whales, the little oysters have been ruthlessly exploited until many of the good breeding beds have been destroyed. The industry is mainly in Prince Edward Island, and in 1882 the production reached 64,646 barrels, but in 1907 it had fallen to less than 28,000. Not only were the oysters taken for the market, but the beds were dug up in many places and the mud used as manure by the farmers along the coast. This mud digging has now been made illegal, but much can be done to cultivate the industry and propagate oysters on a scientific system, instead of allowing it to become extinguished through greed and a lack of intelligence.

The lobsters on the coast of Eastern Canada have been long known for their abundance and quality, and during the past forty years it is said that this region has produced more lobsters than any other part of the globe. In 1869, after the canning of lobsters was started, 61,000 1-lb. cans were produced. The production went on increasing till 1881, when it exceeded 17,000,000 lbs., and then it began to diminish, the present-day output being about 9,000,000 lbs. Live lobsters are also exported to the amount of 5000 to 6000 tons yearly. There has been a considerable falling off here also. The lobsters have become not only fewer in number but smaller in size than formerly, one of the first signs of the decadence of a fishery. As in other branches of the fishing industry, it is obvious that there is need of government restrictions to protect the fishermen from the effects of their own avarice.

Inland Fisheries.—The fresh water fishings of the great lakes are a valuable resource that also requires cultivation. The whitefish is so valuable for food that the supply is unable to meet the demand, and the price has continued to increase in recent years. It is found in all the great lakes, in the waters of the prairie provinces and in those of the Yukon. The advance of civilisation along the shores has combined, with over-fishing, to injure the spawning grounds and diminish the quantity of fish in Lake Superior and Lake Huron, so that the catch is not half of what it was twenty years ago. But on the two lower lakes, Erie and Ontario, the fishing has greatly increased. The spawning and feeding grounds have been damaged or destroyed by industrial pollution,

particularly sawdust, and fish-breeding operations on a large scale are required if the fishings are to be maintained and improved. In Lake Superior no fry are being "planted," but in Lake Erie fish breeding by government on a large scale has been the means of greatly increasing the supply. In Lake Ontario, although the "plant" has not been nearly so large, the fishing was much lighter before 1906 than in other places, and now the catch is double what it was twenty years ago. These considerations show the advantage of regulating the fishings by public statute, and of improving the supply by state hatcheries conducted on a scientific basis, so as to conserve to the utmost a valuable source of food and industry.

2. Vegetable Resources.

Agriculture.

This is much too large a subject to be adequately dealt with in a few paragraphs, and indeed the possibilities of Canadian wheat growing are too well known to need special notice here. But we are considering the development of the country on the best lines, and looking ahead as well as around—ahead to a time of closer settlement after the war and more permanent conditions of existence when peace is secured.

The visitor from the tidy and anciently reclaimed farmlands of North Britain is apt to be struck with the necessarily unfinished appearance of the country even in the older and better settled parts of Canada, and with the signs of waste, untidiness, and needless extravagance in many populous and well-to-do places.

Good land wasted.—One of the points that arrested my attention was the prodigious waste of perfectly good farm land in the outskirts of the large cities, such as Toronto. That part of Ontario has been long settled and cultivated for generations, and the proximity to a good market for agricultural produce such as potatoes, garden vegetables, eggs, and live stock, makes farming near a city particularly profitable. But what do we find? The mania for trafficking in real estate, combined with too much municipal "enterprise"—if we may use such an expression in the circumstances—and far too great a hurry on the part of many worthy people to grow rich quickly, these three things have done much economic injury to the permanent welfare of a large district. Hundreds or thousands of acres that should be producing solid wealth and prosperity have been thrown out of useful cultivation, and are now lying fallow or covered with weeds.

How does this come about? The answer is that the land for miles round the municipal boundary has been sold at an enhanced price by the original agricultural holders to real estate agents, who hope to get a good crop of town lots and buildings on it far more valuable to them than mere turnips or potatoes. Vast sums are spent in laying out and grading new and handsome streets, and in laying drains and waterpipes for a new population that must reach several millions before all the accommodation provided for it is exhausted. If the expected influx of population soon takes place, all this garden city and town-planning

enterprise is good and well, but if—as is quite probable—it is delayed or does not take place for many years, then there will be public disaster, and nothing to show but a dry and empty skeleton instead of a healthy and well-favoured civic being.

Needless roadways.—The splendid new roadways, sixty feet or so in width, radiating for miles into the country round many Canadian cities, when there is no immediate need for them, represent not only great capital outlay yielding no immediate return, but much borrowed money whose interest must be punctually paid. Besides this, they occupy large areas of good agricultural land that might be paying some rent, and at the same time contributing to the needs of the community.

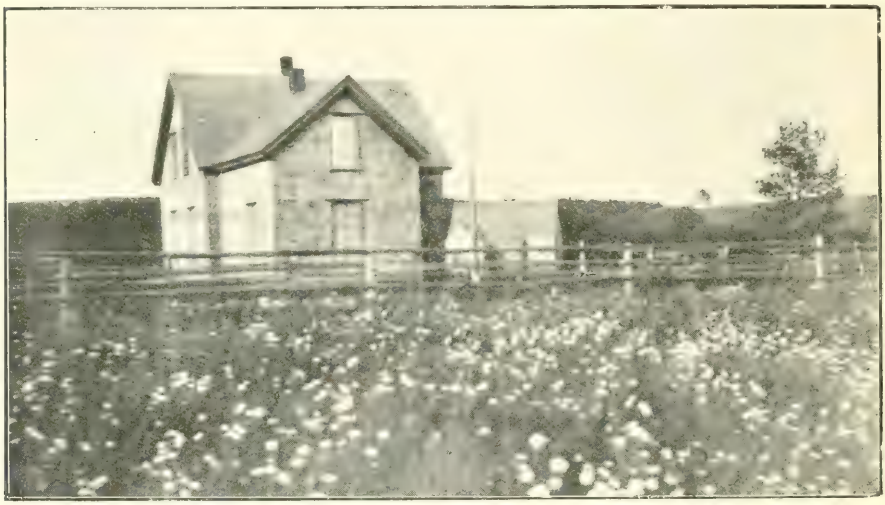
But further than this, what struck me most forcibly was the fact that not only the *solum* of the projected streets but the far larger area of building land in the blocks between them was also put out of cultivation by the operations of the real estate speculators. I was told that the reason for this was that nobody would farm the land if he knew that at any moment parts of it might be cut off for building lots, and his rotation of crops would be disturbed.

Now it so happens that the writer has some practical knowledge of both agriculture and civic engineering acquired on his own small domain in Scotland, and can speak with sympathy born of hard experience on this subject. Some years ago I spent several thousand pounds on laying out and constructing a few handsome streets at a small town where the population had been steadily growing, and there was every reason to suppose the ground so developed would soon be wanted for building. But in consequence of the recent land legislation and local slackness of trade, the building of new houses was arrested, and the expected population did not arrive to inhabit the proposed garden city area. For the last ten years the good farm land let at £2 per acre, which these useless streets now occupy, has lain for the most part idle, and may not be wanted for the next decade, so that I entirely sympathise with those who in Canada have also been too enterprising, but on an immensely larger and more costly scale. But then I did not make the further mistake of throwing all the adjoining land out of cultivation from the fear that at any moment it might be cut up for building. No, the land still continued to be cultivated on the understanding that for any section taken off, the farm tenant would receive suitable compensation from the builder for unexhausted manure and loss of crop.

Since war has changed the aspect of the political and economic world, Canadian borrowings for new enterprise will perhaps be checked severely for a time, and also the flow of emigration from the old country. The economics of the situation will have to be more carefully scrutinised, and municipal outlays reduced until the belligerents recover from their terrible exhaustion. What might well be done now to ease the situation in one small way is to resume the cultivation of these city fringes, and do it on the intensive system by mixed farming, with a suitable rotation of crops. Cattle, cows, sheep, poultry, and pigs should be bred and fed on these vacant blocks until they are needed for building, and a variety of cereals cultivated also, and the

probabilities are that the farmer's work will not be much disturbed for a long time. The plan should be tried in Canada that works so well in bonnie Scotland of leasing the land for a term of years from the owners at an ordinary agricultural rent, and giving the tenant reasonable compensation for disturbance if and when all or any part of the land comes to be required for municipal purposes.

The real estate holders would thus, in drawing temporary rents, receive at least some return from this land, if not nearly all they would like. The cultivator, being situated so near a city, would be able to sell his produce to the great advantage of both himself and his customers. The latter would be better served with eggs, milk, butter and potatoes fresh from the outskirts of their city rather than from the end of a long



A deserted homestead overgrown with ox-eye daisies in Antigonish district, Nova Scotia.

and needless journey from the remote country, or even all the way from the United States!

As land becomes dearer and the better agricultural areas more thickly populated, the advantage of mixed farming and more intensive cultivation will become more apparent. A well-manured farm of 500 acres that produces as much as an ill-cultivated one of 1000 is much the better of the two, as it requires less labour and less outlay on the roads, drains, and fences; and in a country where wages and expenses are high it is almost needless to remark that economy is necessary in all directions if success is to be attained.

Another point that requires attention is the dissemination of better knowledge of agricultural practice, so as to make the most of the land that is under cultivation. It is not possible, of course, to educate a whole community at once, but it is rather disappointing to read from the Report of the Commissioners (p. 201) that out of some 2245 farms they had surveyed, 30 per cent. showed a decreased crop per acre, and

only 40 per cent. reported an increase as compared with ten to twenty years ago.

Weeds.—The land in some places is allowed to produce two crops at one time, one of them weeds, and the latter often increase so fast that the farmers are quite unable to get the upper hand, and have in some places been forced to abandon their farms altogether and flee to cleaner districts. I have seen in Nova Scotia many abandoned holdings, with good houses going to ruin, and the fields covered with a dense crop of ox-eye daisies, and other picturesque and equally useless plants, mixed with pine seedlings sown by the wind from the adjacent forest. These lands are reverting to the state of primeval forest from which they were cleared with great labour by the original settlers more than a century ago. Their descendants are leaving their fathers' crofts, hoping to make fortunes on the prairies, where the climate is less rigorous in winter and the soil more productive. One of these is shown in the accompanying photograph taken in Antigonish County in 1913.

The growing of nothing but wheat on the prairies, and the continual cropping of the ground with one cereal, will exhaust its fertility in time just as the Americans have already exhausted much of their wheat land, and as the Scots did two centuries earlier, before the modern systems of rotation, mixed farming, and systematic manuring were introduced.

But the exhaustion will not be felt while there are still almost unlimited tracts of virgin soil to break up, and indeed it will probably be impossible for a long time to cultivate the newer territories advantageously in any other way. The more scientific system is only immediately applicable to the older districts, such as Ontario and Quebec, and only to some parts of these provinces.

Wheat.—The production of wheat has, mainly in consequence of the immigration of settlers, increased enormously in recent years. For 1915 the crop was 376 million bushels as against 161 millions in 1914. It was thus more than double the crop of 1914, which was a poor one, but 46 per cent. more than the previous highest yield of 1913. In 1914 the price of wheat before the war was 93 cents per bushel, or 31s. per quarter (of 8 bushels of 60 lbs.). The war and the closing of the Dardanelles and Russian exports from Odessa has been mainly responsible for the great rise in the price of wheat in 1915. In Britain this has risen to 60s. or more per quarter, from 31s. in 1914, while in Canada it has increased from 93 cents to 1.60 dollars per bushel. All the wheat, of course, has not been sold at this figure, but it was a matter of the greatest importance when, as a result of the war, the bumper crop of 1915 brought the highest price for the last forty years and provided a large additional supply of money at a time when it was so sorely needed in the Dominion. The total value of the Canadian crops in 1915 is estimated by the *Monetary Times* of Canada to be £60,000,000 in excess of the value of the crop of 1914.

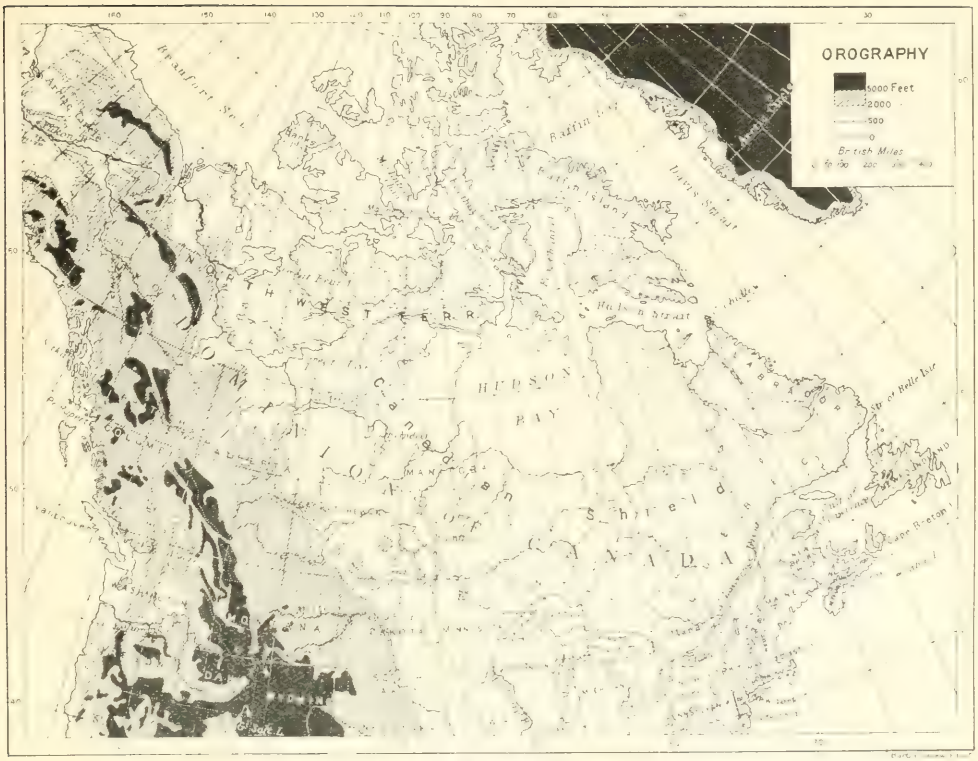
One disadvantage of farming with a single crop is that the success of it depends greatly on the season. Where, as on the wide prairies, the weather in any year may be unpropitious, the conditions are so uniform that a large region will be affected, and there may be great fluctuations

in the value and amount of the whole harvest. In places where mixed farming is practicable this drawback is minimised, and a wet summer or late spring unfavourable to wheat may be admirable from the grazing point of view, while a dry summer that reduces the grass may produce excellent wheat and potatoes. With a good system of mixed farming it is impossible for all the crops to be ruined by the weather at once.

Besides wheat, oats and barley are grown in greater quantities every year. It may surprise some readers to learn that in 1915 Canada produced more oats than wheat. The oat crop was 520 million bushels, against 313 million in 1914, and there were over 50 million of barley. The crops of oats and wheat were each about one-third of the crops of these cereals raised in the United States, which shows that, in proportion to population, Canada is by far the greater bread producer of the two.

Agricultural Area.—The agricultural area, more or less capable of development, is confined to the part of Canada covered in its northern tracts by thick forest. If we draw a straight line across the map from the Straits of Belle Isle westwards to the head of James Bay and onwards to the southern end of Lake Athabasca and thence north-westward to the Pelly River and Dawson City on the Yukon, we define the extreme northern limit of this zone. Indeed a large part of it is quite incapable of cultivation and fit only for trees. The so-called "Canadian Shield," comprising the northern part of the provinces of Quebec, Ontario, and the immense region west and north of Hudson's Bay, is geologically made up of hard granite and other kinds of barren crystalline rock. It was swept bare of soil by the great glacier of the Ice Age, from whose destructive ravages it has never recovered, and is covered with lakes, streams, and bogs, and tracts of primeval forest only partially explored. Beyond this zone the northern wastes become more thinly clad with smaller trees and bushes, and are quite useless for close agricultural settlement. (See map.)

Prairies.—But the resources of the western prairies are not nearly exhausted, and there are wide tracts of land awaiting opening up by railways that will absorb all the settlers for a generation to come. The Grand Trunk Pacific line lately opened, that crosses Canada and runs from Edmonton over Alberta and British Columbia to Prince Rupert on the Pacific Coast, will open up an immense new territory. But there is much good land still further north in the Peace River district that can be made available when the railways are pushed further north and west. All these developments, it need hardly be said, depend on the supply of capital from outside, and the great war has destroyed so much of the world's available wealth that it may be many years before Canadian enterprise will recover from the shock and obtain the needful help from more wealthy lands. It is much to be regretted that the mad speculation of recent years on real estate, and the prodigious waste on needless developments round rising cities, has diverted into useless channels and locked up huge sums that might have been far better spent on the railways and roads that are absolutely required to tap the



Orographical Features of Canada.

Distribution of Vegetation in Canada.

agricultural resources of the more remote districts. What is needed here is to "ca' canny," stop speculation and waste and conserve the existing resources of wealth, of which there are many, and no doubt others that have not even been considered or explored.

Forest Resources.

The people of Canada used to believe that their forests were quite inexhaustible, but more recent and accurate research has shown that this is by no means the case. Professor Adams says, "The evidence goes to show that at the present rate of cutting, the supply of timber will, within a comparatively few years, be sufficient only for the needs of the Dominion itself, leaving no surplus for export" (p. 15).

Exhaustion of Forests.—In Nova Scotia Dr. Fernow, who has made a detailed forest survey, has shown that if the sawmills now at work continue their present output, the merchantable timber will be exhausted in the next twenty years. The old and more valuable kinds of timber have been ruthlessly cut out in large areas, many of which have been granted to American timber companies, who care nothing for the future of Canadian forestry, and are only there to make the most they can in the shortest time.

While a large part of northern Canada is covered with trees it is more a woodland than a forest-land with heavy timber. The practice has often been followed of cutting out the valuable trees and leaving behind inferior species known as "tree weeds," which, like other kinds of weeds, are apt to be very prolific and to multiply, and in time deteriorate the value of the whole forest.

So far back as 1895 the Dominion statistician reported that the first quality of pine had disappeared, and that "we are within reasonable distance of the time when, with the exception of spruce as to wood and British Columbia as to provinces, Canada shall cease to be, as now, an exporting country."

The rivers draining the northern forest mostly run into Hudson Bay, so that the forest area on that side of the watershed or "height of land," as it is called, has its value much diminished. Timber that cannot be floated or carried easily to market loses its value proportionally, and may not be worth cutting at all if the expenses of transport rise to more than its market value.

Pulp wood.—But wood that is too small for logs may be used for making paper pulp, and in recent years a great demand for pulp wood has sprung up. This industry is not quite so destructive to the forests as the heavy lumber trade. If it takes one hundred and twenty years for a spruce tree to reach 12 inches in diameter and produce logs that can be sawn, such a forest crop has a rotation of over a century before it can be cut again. But half a century will suffice for a crop of trees only 6 inches in diameter, and in favoured places some trees will reach that size in twenty-five years or less. I have grown fine specimens of black Italian poplar on good ground in Scotland that reached a diameter of 1 foot in twenty-five years, and would make good pulp.

Forest Conservation.—In eastern Canada the forests can be maintained if proper attention is given to the amount that is cut each year and the requisite rotation of crop provided for. If each timber company has a large enough forest area to work on, and cuts say one fiftieth of its area each year in a systematic way, it can at the end of fifty years begin again, and so the forest will be preserved and there will be no final exhaustion of the crop. But of course proper means must be taken that young trees are sown or planted on the ground so that they will grow up as soon as the old ones are cleared off. It is quite easy, and, indeed, a very common practice to clear away a forest and leave no "mother trees" to drop their seeds and produce a new family on the cleared area. The ground, like most of the hilly or mountainous Canadian forest land, may be rocky and only covered with a thin skin of vegetable soil, which if left exposed to the weather will soon be all washed away unless a young wood quickly springs up to protect it. The ruthless destruction of forests in this way has brought untold disaster to many once fruitful lands in Europe and Asia, on the Mediterranean coasts, and the damage can never be repaired as all the soil has been washed away and none is left for new trees to grow upon.

Forests and Rainfall.—Another and very important advantage of forest conservation relates to the question of water supply. The woods intercept the irregular rainfall, store it up and regulate it so that great floods are prevented and the flow of the streams is maintained, more or less, in uniformity. In a country where the conservation and utilisation of the water power is important it is necessary to prevent both waste in floods and deficiency in droughts, and the only way to do this is to see that the catchment areas are not denuded of trees.

In British Columbia the mountains are for the most part still covered on their lower slopes with dense forest of spruce, pine, and cypress, but the giant trees that used to flourish near the sea have been mostly all felled. A few remaining specimens of these ancient giants are preserved in the Stanley Park at Vancouver (see fig. p. 128). In that moist and mild climate trees grow well. The mountains of the coast-range are fit for nothing else, and with proper care the growth of timber trees may quite well be maintained so that future generations will not succeed to an impoverished inheritance.

Forest Fires.—One prolific source of injury to the Canadian forests arises from the fires that occur every summer when the ground is dry. These are very often caused by the sparks from the engines of passing trains using unsuitable fuel, which do enormous damage in a way that is very difficult to prevent.

The railways are held responsible for forest fires breaking out within 100 yards of the line, and a staff of fire rangers is kept in British Columbia to protect the forests and if possible extinguish fires that may break out. The locomotives running on some parts of the Canadian Pacific Railway in British Columbia have been constructed so as to burn oil instead of coal, which is an effective method of preventing sparks, and if this system could be extended it would prevent enormous damage and anxiety during dry weather.

Forest Reserves.—The Canadian government has wisely set apart several great tracts of forest reserve, reaching in all to 35,000 square miles, to protect the catchment areas of some of the more important streams. These are in addition to the National Parks already referred to, and have in recent years been greatly increased in size. In the forest reserves no land can be taken up for settlement, and the forest cover will be permanently preserved.

There are tracts of impoverished, abandoned land in some places that might be advantageously planted, and some of the sand dunes in

Stem of *Thuia gigantea*, one of the remaining giant trees in Stanley Park, Vancouver. The figure leaning against the right side of the bole indicates its size.

parts of Quebec could be afforested, so as to prevent the further encroachment of the drifting waves of sand, just as the desert of sand dunes in the Gascogne district in France has been reclaimed and turned into a forest of enormous size and value.

Peat Mosses.

Peat is not generally reckoned a vegetable product of much importance, particularly in Canada, but even here we have a source of wealth that may, under certain conditions, be turned to good account. In Canada it must be remembered the distances are great and the cost of transport is always a most serious consideration. The greater part of the coal in the Dominion occurs in Alberta and the region west of the

prairies and in the smaller coalfields of Nova Scotia on the eastern coast. In the central provinces there is thus no natural fuel except wood, and this may be exhausted in time, if not carefully husbanded.

Utilisation of Peat.—The utilisation of peat fuel is thus a subject worth considering, especially in the localities where peat bogs of considerable size are known to exist.

The subject of peat and its commercial utilisation in Europe and Canada has been carefully investigated for many years, both by scientific and industrial minds, and, although the question is an attractive one, it must be admitted that many very promising schemes—probably most of them—have resulted in costly failures.

Dry peat is a valuable material out of which many useful products can be extracted. But the main difficulty always has been to get rid cheaply of the water which constitutes over 80 per cent. of a peat bog. Peat can be cut, and dried in the sun, so as to yield fuel with only 20 to 30 per cent. of moisture, but that requires a dry season and cheap labour such as is not easily obtained in Canada. With so much moisture plus a considerable quantity of ash, the value of sun-dried peat fuel is always much below that of coal, and the difference in price must be very appreciable before peat can take the place of coal on the domestic hearth. In Sweden and some parts of Scotland and Ireland, where, until the war, the price of labour was not high, the cost of casting peat was reasonable, but the high wages and the cost of living in Canada operate against the development of any kind of industry that requires much manual labour in proportion to the volume of the output.

But here there is room for mechanical aptitude and inventiveness. The peat can be cut in blocks or ploughed out by special machinery, and can be distilled so as to produce many other useful things besides domestic fuel.

The water in peat is inherent in the vegetable cells, and many disastrous trials have proved that it cannot be squeezed out by any mere mechanical process. This difficulty is claimed to have been recently overcome in the Ekenberg Wet Carbonising process. By this system the watery peat pulp direct from the bog is passed through a superheated boiler or system of pipes over a furnace, and when raised to a temperature of 230° F., and kept at a high enough pressure to prevent boiling, the slimy hydrocellulose, one of its essential ingredients, is decomposed, and the pulp can then, it is said, be dried by pressure quite easily. The process is worked on the regenerative system so as to save heat and fuel, but so far no practical results have been made known to the public, and the process may be regarded as still in the experimental stage.

However that may be, it is important to know that the possibilities of many large Canadian peat mosses have been carefully studied, their sizes and depths surveyed, and their contents analysed and described both chemically and from the botanical point of view. Messrs. S. A. Anrep and Erik Nystrom have published valuable accounts of the researches in their reports to Dr. Eugene Haanel, Director of Mines, Ottawa, in 1909 and 1912. These relate to certain bogs in Ontario and

Manitoba, at places favourably situated from the point of view of transport and market.

The total area of the fourteen peat bogs reported on in 1911 in the Province of Ontario was over 47,000 acres, and the largest of these was the Holland Bog in Simcoe and York County. This is 14,641 acres, or nearly 23 square miles, in extent, and at a few places 23 feet in depth. It is estimated to contain over eight million tons of fuel, containing 25 per cent. of moisture, and 10·5 per cent. of ash.

Ammonia from Peat.—The dry peat of this great bog contains the unusually high percentage of 2·7 of nitrogen, which is a point of great commercial importance for the following reason. Peat can be distilled so as to yield carbon, tar, oil, paraffin, acetic acid and its derivative acetone, but the nitrogen can also be recovered and converted into sulphate of ammonia, an agricultural fertiliser of great value, and one of the most important products of the Scottish Oil Shale industry. Now, theoretically 1 per cent. of nitrogen produces about 70 lbs. of sulphate of ammonia per ton of peat, and in this case 2·7 per cent. should produce 189 lbs. This salt was, in the beginning of 1916, selling in Scotland at more than £15 per ton, or say 1½d. (3 cents) per lb., and no doubt at a much higher price in Canada. If the full theoretical amount of sulphate of ammonia could be extracted from the Holland Bog, one ton of dry peat would produce $189 \times 1\frac{1}{2}$d. = £1, 3s. 7d., or say $5.67. This, in addition to other products of value, should surely induce some enterprising chemical technologist to try to utilise the bog and establish a new branch of industry that would be of much use to Canadian agriculture and other trades.

Of course, the whole theoretical value of the nitrogen is not likely to be obtained, and the water must first be eliminated. But when we consider that it is possible to distil Scottish oil shale very profitably that contains 70 per cent. of ash and yields only 50 lbs. of sulphate of ammonia per ton, and which has to be first mined from depths sometimes of over 1000 feet—with these facts before us surely something of value awaits enterprise in the vast expanse of the Holland Bog.

There are doubtless many other unexplored peat mosses in Canada —muskegs as they are called—occupying swampy hollows that must be drained before the peat can be utilised. Only a few have been surveyed, probed with boring tools and analysed, and the quality of the peat has been found to vary greatly. Not many of them have been found so rich in nitrogen; and in this respect, as well as in size, the Holland Bog so far appears pre-eminent.

Further than this, seeing the bogs are generally on the sites of shallow lakes that have first become silted up with mud and then overgrown with peaty vegetation, the drainage of them and the removal of their barren peat covering may be the means of reclaiming tracts of good alluvial soil that will add appreciably to the agricultural resources of the locality.

(*To be continued.*)

THE SO-CALLED MYTHICAL ISLANDS OF THE ATLANTIC IN MEDIÆVAL MAPS.

By William H. Babcock.

The Islands of Antillia.

(*Continued from page 79.*)

Behaim's globe transfers the usual configuration of Antillia to St. Brandan's Island, and makes the former smaller and nearly elliptical in shape. Its position is still rather far westward and distinguished from every island of the eastern archipelagoes, but nearer to the tropics than on Ruysch's map. Behaim gives it both names, "Insula Antilia genannt Septe citade," with a German inscription to the effect that in 734 the Archbishop of Oporto, Portugal, and six other bishops and other Christian men and women, established themselves there, and that a ship from Spain went to this island in 1414.

Justin Winsor[1] gives the following résumé of relevant utterances by a son of Christopher Columbus, or whoever wrote the biography somewhat hesitatingly attributed to him:—

"Ferdinand claimed to have found, in his father's papers, some statements which he had drawn from Aristotle of Carthaginian voyages to Antillia, on the strength of which the Portuguese had laid that down on their maps in the latitude of Lisbon as one occupied by their people in 714 when Spain was conquered by the Moors. Even so recently as the time of Prince Henry it had been visited by Portuguese ships if records were to be believed."

Similarly Galvao, in his *The Discovery of the World*, reports the visit of a ship to it in 1447.

Eden's "preamble" to his translation (1597) of Peter Martyr's *Decades* relates a much later (and very apocryphal) adventure of the same kind. It seems that a ship was carried by the winds across the Atlantic from Spain or its neighbourhood to an unknown land, where all the party died but the pilot and three or four others. He navigated the ship back to Europe and died in the house of Columbus: "with whom remained all such writings and annotations as he had made of his voyage in the said caravel."

Finally, Sebastian Cabot, testifying as an expert in a lawsuit growing out of the voyages of Columbus, was asked concerning the discoveries of the latter, and replied that Solinus, a geographical authority, had previously delineated certain islands known as the Hesperides, and he thought these were probably the same that had thus been found.

Probably Eden and this younger (and considerably distrusted) Cabot need not be relied on, except to show a widespread and long-continued impression in Mediterranean Europe of the sixteenth century that the

[1] *Christopher Columbus*, etc., p. 111.

West Indian islands had been visited and made known before Columbus undertook his great enterprise. Standing alone this could have no decisive weight, but perhaps it is not wholly unpersuasive in corroboration of more reliable data.

Behaim's statement agrees well with the still incomplete record of the maps. There is no fourteenth-century delineation of Antillia, nothing but the Pizigani inscription and image already mentioned, apparently concerning the outer Azores. An unnamed and undated map preserved at Weimar has become celebrated as made in 1424 (ten years after Behaim's discovery date), and as being the first to show Antillia. Humboldt thought it of that year, but is understood to have changed his opinion later by reason of the explanations of Mr. Reimer, then librarian at Weimar, whose successor, Mr. Paul von Bojanowski, has kindly written me a full account of the matter, and is convinced that this map is the work of Conde Freducci, probably about 1481 and certainly not earlier than 1461 or 2. As the activity of this member of the cartographical Freducci family of Ancona extended mainly from 1497 to 1535, he could not have made a map in 1424. His well-known dated and named map (Wolfenbuttel of 1497) was believed by Mr. Reimer on comparison to be derived from this undated one, which Mr. Bojanowski considers to be identical in the main, although older.

On the other hand, Nordenskjöld and Kretschmer accept it as of 1424, which would make it begin the Antillia series of maps thus far found. Of course Freducci might have copied pretty closely, in 1497, the delineation of an earlier map which was not his own. The chief questions arising in the matter seem to be: Do the two maps share a style of workmanship and peculiarities of details which can positively be identified as Conde Freducci's alone? And, if there still be any doubt as to this, is there anything to fix the date of the earlier one?

The original of the earlier map is evidently much faded and blurred, and the photograph of it taken for me in Weimar shares these defects, making comparison difficult. In coast and island delineation no certain test seems to offer, for we find the type, which both show, settled soon after 1424, and it probably was so before that date. In inscriptions there is more difference, the earlier map having none which exceed a line, whereas the later map tends to wordiness. Thus there is a long indistinct paragraph (in Dr. Kretschmer's copy), having Antilnarum or Antilliarum for one of its first words, and inscribed near the western border of the map, just eastward of the place where the West Indies or the Islands of Antillia naturally would be. Whether the difference in verbosity should be explained by the difference between two minds or between the same mind in two stages of information is not clear.

As to the date of the earlier map, there is perhaps a little more evidence. The inscription which most clearly appears on my photograph of the Weimar map is "Insule fortunate sancti brandani," arranged, as usual, transversely above Madeira and Porto Santo, but more to the right than in most cases. In Beccaria's maps of 1426 and 1435 it is "Insulle Fortunate Sancté brandany." Pareto, 1455, also uses this archaic duplication of the *l* and substitution of *y* for *i*, both of which seem to

have been general in the preceding century. Dulcert has both in 1339, and Pizigani, 1367, adheres to the final *y*, though using the Italian word Isole instead of Insulle. But by 1482 a change had taken place, for Benincasa's map of that year spells both words as in the Weimar map. This comparison plainly tends to establish for the latter a date in the last quarter of the fifteenth century, and at least shows that we must not treat it as of 1424. Yet since this has usually been done, and for convenience, I take it up first in order.

Santorem's copy cannot be used to advantage, chiefly because it is not extended far enough to include Antillia. It also shifts the words "Insule fortunate sancti brandani" nearer the Azores, where it may seem to apply to them and not to Madeira. It was probably copied from a previous handmade copy, less complete and accurate than had been supposed.

Like many other portulano maps, the original was drawn on parchment, now sadly the worse for time and wear, made of a lamb's skin, having the narrow neck turned toward the west, where least harm could be done by omission in the judgment of most people. Thus in the present instance only the upper half or little more of Antillia is shown, ending on an oblique and slightly curved line, though the whole name is legible (running from north to south) except a part of A, perhaps lost by rubbing or trimming. If any other island should be west of the lower part of the figure, of course it would also be wanting for lack of room. Above it, at about the same interval as that given by Beccaria, 1435, soon to be considered, a second island, of the same general form, the same width, and perhaps a little less length, is marked with a name beginning S. Mr. Bojanowski reads San on the original, but the initial is all that my photograph shows me. There is not space above it for another island short of the slanting neck-border. The lower island, Antillia, is slightly inclined to the right as compared with its neighbour. There are three rounded indentations in each of the long sides of the upper island, its lower end being square, and its upper end inclined up from left to right in a slightly concaved and indented line. Two indentations distinctly show in the right side of Antillia, and one on the left side, with uncertain marks of another indentation below in each side. Its upper end is square. All considered, the display is such as would naturally be made by a draughtsman copying an original corresponding in nearly all respects with Beccaria's, excepting slight differences in the width and angle of Antillia, the exact position of one or two indentations, and perhaps other minor details.

Beccaria's map of 1426 is mentioned by Nordenskjöld as showing Antillia, but Kretschmer's description does not bear out the statement, though he describes Antillia and companions as occurring in Beccaria's map of 1435. I have endeavoured to obtain a photographic copy which would be conclusive on this point: but by some misunderstanding the one sent me omits the narrow neck of the map corresponding to that which contains Antillia and neighbour on the Weimar map, and therefore is no more helpful than Santorem's incomplete version of the latter. Until further light, I cannot be sure whether Antillia is or is not shown

in the map now considered. Perhaps the evidence leans rather to the negative: for, putting the two Beccaria maps together so that the Azores will coincide, it appears that there would be space for Antillia and Salvagio on the earlier map as they are shown on the later—a space now occupied by highly ornamental vessels sailing up and down, and by the feet of westward-extending ornamental figures, cut off at the ankles by the limit of the photograph in that direction. But of course the earlier map may have shown a greater interval between the Azores and Antillia, and the intermingling of fancy figures and geographic outlines is common enough in old cartography.

The Beccaria map of 1435 above mentioned is not only the first complete representation thus far found of the "Islands of Antillia," but on the whole it is the clearest and best. Antillia here is broader and longer than Saluagio (Salvagio—Savage Island) above it, the former being a little inclined eastward from the north and south line, though much less markedly so than on the Weimar map, and shown in full length with a deep curved recess in its lower end, four indentations in its right side at equal intervals, and three equidistant indentations in its left, each indentation of each island approaching a three-lobed form with the lobes rounded. Beyond Antillia on the west is a smaller and nearly square island, having a western protuberance in the form of a broad, low equilateral triangle. Its name is given as Reylla (Rey-illa, King Island). In its position, behind the lower half of Antillia, and its relative size and compactness, it recalls Jamaica considered with respect to Cuba, as Salvagio recalls Bimini, that is Florida.

Just north of Salvagio at a slight interval is a crescentic island rather less than Madeira in size, with its hollow face toward its larger neighbour, and bearing a name formerly deciphered Tanmar, but now I. in Mar (Island or Islands in Sea), on the excellent map published in the *Studi* of the Italian Geographical Congress of 1875. It might well be one of the larger Bahamas, say Great Bahama and Abaco taken together, for they are nearly continuous, collectively have a crescentic form, with a landward-facing hollow side, and are but slightly offshore, though obviously more at sea than the rest of the group. A slight error in direction might follow as a consequence from the greater error of supposing the peninsula to be quite insular, the severance from the mainland being perhaps supposed to occur near that barely divided island.

Beccaria gives the archipelago, as a whole, the significant name or comment, "Insulle a novo rep'te" (recently reported islands)—a conspicuous inscription, which agrees pretty well with Behaim's statement of discovery or rediscovery in 1414. The interval in time was nearly as great between the landing of Columbus on the West Indies and the publication of the first part of Peter Martyr's *Decades*, beginning with the equivalent words, "Concerning the islands of the ocean lately discovered." Moreover, it is likely that Beccaria copied an earlier map, not yet found, for the island outlines in their artificiality undoubtedly suggest a settled convention rather than a first appearance: also the slight differences of later maps yet to be considered are perhaps more

easily explained by a common original than in any other way. The discovery, if real, can hardly have happened long before or after the date named by Behaim—which seems an instance of accurately preserving a tradition which had come to him by a very lengthened road.

Almost as early as Beccaria's map above considered, another by Andreas Bianco (1436) showed the two main islands, with the same arrangement, form, and proportion, so far as the interference of the map-border will enable us to judge. In this instance the plight of the Weimar map is reversed, for the whole of Antillia shows plainly, with the orthodox number of bays on its sides and the deeper gulf at the lower end, whereas we are given only the lower end of La Man (or Mao) de Satanaxio, the Portuguese for The Hand of Satan. Some have believed this substitute for "Salvagio" to be derived from an Oriental myth of an island thus fearsomely named. Nordenskjöld[1] and others, on the contrary, suppose it was originally a saintly name, perhaps The Hand of Saint Anastasio. But there seems no support for either fancy, excepting (as to the later) the name St. Anne, St. Anna, or Santana, applied on some later maps to a small island elsewhere in the sea, which may possibly inherit "Anastasio" in this changed and contracted form. But, of course, there is a simpler explanation in the remembrance of St. Anne herself: perhaps revived or stimulated by the recurrence of her special day in the liturgical sense, on the occasion of some supposed discovery.

La Man de Satanaxio has sometimes been erroneously confounded with the crescent-form island, in that century commonly called Man, which appears on the same map, as on many others, very much farther to the north-east. No doubt the application of "Man" to the two islands as the entire name of one, and part of the name of the other, is an interesting case of coincidence by convergency, a Gaelic and Latin root meeting exactly in form and having the same significance; but it is nothing more.

Humboldt seems inclined to believe Bianco's map earlier than Beccaria's, but later inquiry has decided otherwise. He further supposed that Bianco had produced a still earlier planisphere, of which we seem to hear nothing recent, though it would be most interesting. It might show what the parchment limits deny to the map before us, the upper end of the island beginning with S, the Insula in Mar above it, and the westward Reylla behind Antillia.

Restriction on the westward side, not mechanical but rather the out growth of indifference, may be predicated of some other notable maps of that century: for example, Giraldi, 1426, Valsequa, 1439, and Fra Mauro, 1459, which do not attempt to extend their area far enough beyond the old world shore to include this remote western region. These must have heard rumours of the Islands of Antillia, and either not credited them or not cared, for Valsequa was but four years behind Beccaria, and Fra Mauro but four years behind Pareto (1455), who duplicates the former's map, except as to one island.

This last fine map is conscientious as to the number and arrange-

[1] *Periplus*, p. 164.

ment of the bays in the sides of Antillia: the size, shape, and relative position of Reylla, a name which he mistakenly corrupts into the unmeaning Roillo; and the size, shape, and location of Insula in Mar (without a name), but Kretschmer's copy leaves a gap where the long Salvagio or Satanaxio ought to be—unaccountable except by the possible disappearance of the figure once duly drawn there.

Roselli's map, 1468, is an excellent instance of this sort of thing, for the eastern part of Roillo (Reylla) is really there in a ghostly way, the remainder being cut off by the map border. A little more fading and all would be gone. However, there is now no doubt about it, as shown by the enlargement prepared for me from the negative taken for Stevenson's monograph on Portulano Charts, the original being in the possession of the Hispanic Society of America, New York, of which he is secretary. As shown by the island name last quoted, Roselli seems to have chosen Pareto's map for his model: but he shows the upper and lesser rectangular island very distinctly -bearing the name Saluaega. That of the fourth and least island of the group is less easily deciphered. It seems to be "In mar" without the preceding I—which in like cases is used or omitted at the map-maker's fancy. Antillia slants upward to the left, instead of to the right, as in the Weimar map, and less markedly in that of Beccaria.

Graciosa Benincasa in his map of 1482 reverses Pareto's choice in eliminating islands (if it is not another case of fading) and retains Salvagio (as Saluaga), but leaves out Reylla, both figure and name. He maintains in the islands shown the standard tradition of outlines, the number and arrangement of indentations and other details of topography, and he adds a very remarkable and suggestive feature in certain local names apparently associated with the various bays or the regions around them. On Saluaga these are Duchol, Arahof, Imada, Nom, and Consilla: on Antillia they are Aira, Anhuib, Ansolli, Ansessolli, Ansodi, and Con—of which Aira is given the largest bay. There is a faint suggestion of this name in Beira, that of the largest Portuguese province, but it must be owned that a search of the map of that country is singularly unhelpful in this instance. The frequent repetition of "An" as the first syllable, following the lead of Antillia, makes the series seem rather arbitrary and capricious; but the names of the upper island are free from this peculiarity. Nor does Kretschmer's hypothesis of the Seven Cities explain the names on Saluaga, where there were no legendary towns, bishoprics nor bishops, so far as we know. These names suggest in their local distinctions, but not otherwise, the Indian names which Las Casas and Peter Martyr report from different points around the coast of Cuba and neighbouring regions: and we need not expect much more accuracy or reliability than in the names affixed by early explorers to American rivers and native townsites, which played all sorts of havoc with the original Algonquian words. But it is, perhaps, more likely that Benincasa's names are meaningless arbitrary selections from remembered Arabic and Latin-derived sounds, reported by a Portuguese and repeated by an Italian. What they mean or stand for, if anything, cannot now be told, nor how the map came by them.

Henricus Martellus Germanus[1] of 1489 has no name recalling Antillia, or that of any island in the group, and no form confidently to be identified therewith. His arrangement seems a partial reversion to Edrisi's after more than three hundred years.

The Laon globe,[2] perhaps mainly of the same period or a little earlier, seems to have taken two islands only from some map, which, like the Weimar one, showed these and no more; the names, probably indistinct, being misread and changed in the process into Antela and Salvirosa.

Behaim, 1492, carried a step farther the work of numerical reduction, showing Antillia all alone, as already stated.

There is also a fifteenth-century Catalan map,[3] which, like Bianco, 1448, and apparently for the same reason, gives an extra Azorian north-westwardly slanting series of islands, endowing them with names miscellaneously gathered from fact and fancy. One of them seems to be Atiaella (on this map, not Bianco's), most likely another variant of Antillia.

The 1448 map of Bianco's already mentioned also represents "an authentic island" opposite Cape Verde, stated to be either "fifteen hundred miles long" or "fifteen hundred miles away," as read by different experts in the Venetian dialect, which it uses. Oldham[4] and Batalho-Reis[5] argue strenuously for the latter interpretation, and seem likely to be right. However the words be rendered, this long coast there located is either South America or the land of fancy. The question seems to have little to do with Antillia, in view of the difference in latitude, but was considered in connection with it, in the discussion of Oldham's important paper on the subject before the Royal Geographical Society of London. A much earlier confusion may also be indicated by the Antillia-like figure which La Cosa's map of 1500 shows off the north-east coast of South America as "The island which the Portuguese found": and by Behaim's transfer of Antillia's rectangular form and notable size to the Cape Verde route, as the island of St. Brandan. These later misunderstandings and suggestions cannot help us greatly to decipher the tradition which the earlier maps embody.

Evidently a report, considered to be still recent in 1435, asserted the existence in the south-western part of the North Atlantic of at least four large islands, corresponding approximately to Cuba, Jamaica, the peninsula of Florida, and a member of the Bahamas, in their position as a whole, in relative arrangement, and in individual size and form. Cuba, of course, is elongated, indented with bays, and considerably more inclined than the Antillia of these maps. A report likening it to Portugal in size and elongation would result in giving it on the map the rectangular form of that country. The legend of the seven bishops

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[1] Ravenstein, *Martin Behaim, His Life and Works*, p. 67, map. Also in Lacerda's *Travels of Dr. Livingstone.*

[2] Nordenskjöld, *Facsimile Atlas*, p. 73, copied from d'Avezac.

[3] Fischer, *Sammlung*, xiii. plate 5.

[4] *Geographical Journal* (London), vol. v. p. 225.

[5] *Ibid.*, vol. ix. p. 185.

would require accommodation in the number of the lateral bays. Their individual symmetry and identity of form throughout the series would follow from the tendency of the time, and as the easiest method of delineation. Similar considerations would give the imitative outline of Salvagio, if the latter were reported as also elongated, but somewhat smaller. The Island in the Sea is a little out of place, by reason of the misunderstanding as to the insularity of its greater neighbour, and both it and Reylla are slightly artificialised on a basis of real form; but these unavoidable imperfections offer no real obstacle. The representation of the upper part of the West Indies, including Florida, is distinctly better than that of Scandinavia and its neighbours on maps of the same period.

The names are surely reasonable. I. in Mar is still accurately descriptive and correct in its implied comparison, for the other islands of the group are not out at sea, but in the main Antillean line. Reylla (King Island) may have been given in commemoration of the distant monarch of the explorers, as Cuba for a time afterward was called Isabella, or in recognition of some conspicuous island potentate: and Salvagio or Saluaga (*u* having, of course, the value of *v*) might readily be applied to an island of savage aspect, or an island where savages were found, as in the case of the Salvagies south of Madeira, which are still unchanged in name, and perhaps also in that of the Hebridean island Saluaga on the earlier maps. If explorers reached, or navigators were accidentally driven upon, the Florida shore, they probably would find savage natives awaiting them, and if these were exasperated to the point of hostility and torture it might not be necessary to go to Asia for exhibitions of the Hand of Satan. There seem no other names or variants of names worth further consideration. It must be evident that those of the original series—Antillia, Reylla, Salvagio, and I. in Mar—do not lack verisimilitude, or offer stumbling blocks in any way.

The lack of representation of Hispaniola, Haiti, Porto Rico, the lesser Antilles, and of the Bahamas except one, *is* a stumbling block to the theory as far as it goes, but the argument by omission is never conclusive. It is easy to imagine a voyage to Great Bahama, the Florida coast opposite and below, the outer coast of Cuba, Jamaica, and out again along the eastern end of Cuba, without the ship approaching closely any island shore except some small Bahamas, which would leave no more impression than most of the Azores made on the Pizigani map of 1367, that is to say, none at all. A corner of Haiti might have been dimly seen, but omitted in recital. One interpretation of Ante-illa (Antillia) already mentioned, and suggested or repeated by Formaleoni, implies a sense of the neighbourhood of a greater body of land, before which it lay, and if accepted would involve a recognition of knowledge possessed, or data acquired and believed in, concerning regions not shown on any surviving maps of this time. As to the Antillean archipelago from the eastern end of Cuba to the upper part of Florida, the representation is very much nearer the fact than the delineation of the Hebrides and Orkneys on earlier, contemporary, and even some later maps: and surely no more can be required.

Then, as now, in all the Atlantic, there was no other group of great islands, excepting Great Britain and Ireland, which are fewer in number and were familiar regions visited continually by traders from the Mediterrean. Either the islands of Antillia were actually seen and disclosed to the world, and mapped from that disclosure, or they were the products of mere speculative fancy. But surely it requires very much less credulity to accept the former explanation than to believe in a fancy which could delineate a perfectly unique archipelago of large islands with fidelity to actual relative mass and location, as well as to individual (conventionalised) form and extension, coinciding with reality in so many surprising ways.

That delineation was long and widely accepted as of a real discovery for Great Antillia and her consorts dominate the western Atlantic map-making of the fifteenth century, as Brazil and the Crescent Island especially distinguish that of the fourteenth. During a great part of the first-named era there were occasional strenuous efforts, chiefly directed from the Azores, to discover the intermittently found and lost islands of the west, and sometimes these seem to have been encouraged by the thought of more than islands behind the veil. Batalho-Reis has published in his article before mentioned an interesting summary of a number of these endeavours. In the same spirit Harrisse writes :[1]

"So early as 1431 we see Prince Henry the Navigator sending Antonio Velho Cabral in search of the islands marked on the map which Dom Pedro, the son of Joam I., had brought from Italy in 1428. . . . Diego de Teive in 1452 sailed one hundred and fifty leagues south-west of Fayal to find the Antillia island, claimed to have been sighted by a Portuguese vessel in the time of that enlightened prince. . . . 1457, Dom Fernando, Duke of Beja, receives from Alfonso V. letters patent granting him the islands which he hopes to discover in the Atlantic Ocean. Still believing in the reality of the western isles depicted on the Majorean and Italian charts, the king grants to Joam Vogado two oceanic islands which he claims to have discovered and thinks to be Ova and Capraria. . . . June 21, 1473, Ruy Goncales de Cabrera obtains patents conveying to him the islands which he proposes to discover in the ocean. . . . Alfonso V. directs his chaplain to consult the great Florentine cosmographer Toscanelli. . . . June 25, 1474, the latter sends him a map and explanations. Nov. 10, 1475, Fernan Telles receives extension of letters patent to include Island of Seven Cities. . . . Alvara Joani de Foute and others of the Azores lose their entire fortunes in such ventures. Antonio Lome of Madeira affirms that he has discovered three islands west of Terceira. In 1484 another Madeiran petitions Joam II. to entrust him with a caravel for the purpose of taking possession of an island which he pretended to have found west of the Azores. Jan. 30, 1484, Fernan de Dominguez de Arco is made governor of an island which he hopes to discover. March 3, 1486, Fernan d'Ulmo receives letters patent covering not only islands, but a continent which himself or his agents propose to find westward." Two or three expeditions seeking

[1] Harrisse, *The Discovery of America*, Book iii. pp. 51, 52.

Antillia were sent out by the Portuguese king himself; and one of his nobles, about to set sail on a like venture, was granted Antillia "whether it be an island or part of a continental coast."

Such general convictions of course do not absolutely prove anything, but must always have some persuasive power: but that the indications of the maps can stand for nothing real is quite unbelievable.

Nordenskjöld seems to have been right in declaring: "As the mention of this large island, the name of which was afterwards given to the Antilles, in the portulanos of the fourteenth century is probably owing to some vessel being storm-driven across the Atlantic (as according to Behaim happened to a Spanish vessel in 1414) those maps on which this island is marked must be reckoned among Americana." They are accordingly classified in his *Periplus* under the heading "Maps relating to the New World."

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Lectures in March.

The Rev. Walter Weston will deliver the concluding lecture for this session when he addresses the Aberdeen centre on the 21st March, and the Dundee, Edinburgh, and Glasgow centres on the 22nd, 23rd, and 24th respectively. The subject of his lecture will be "Exploration in the Northern Japanese Alps."

OBITUARY

SIR CLEMENTS MARKHAM, K.C.B., F.R.S.

By the lamented death of Sir Clements Markham we lose one who for many years took a leading part in geographical work in this country, whose work as an explorer carries us back almost to the time of Sir John Franklin's Arctic Expedition, and who will long be remembered as one of the great Presidents of the Royal Geographical Society.

Clements Robert Markham was born in Yorkshire in 1830. He joined the Royal Navy in 1844, retiring from that service in 1852. While still serving in the Royal Navy he took part in the Arctic Expedition of 1850-51 in search of Sir John Franklin. It was his experience with this expedition which no doubt stimulated his natural inclination for exploration and led him to devote his great ability and energy to the study of scientific geography. He possessed considerable literary talents and was the author of a number of valuable geographical works. His literary activity was not confined to geography, for he wrote some good biographies and other works.

After his retirement from the Royal Navy he carried out explora-

tions in Peru and the Eastern Andes. At this time cinchona was getting scarce and very costly owing to the wasteful way in which the Indians cut the bushes. Mr. Clements Markham and his companions collected a quantity of cinchona seed during their journeys in South America; this seed was planted in Ceylon and the Nilgherries, and throve so well there that the supply of quinine became ample and cheap. It is difficult to exaggerate the value of this work. Mr. Clements Markham, however, did not confine himself to it but acquired during his travels an amount of geographical information which made him an authority on parts of South America.

From 1867 to 1877 Mr. Markham was in charge of the Geographical Department of the India Office, and in 1868 he took part as geographer in the Abyssinian Expedition. He became Hon. Secretary of the Royal Geographical Society in 1863 and held the post for twenty-five years. He was President of that Society from 1893 to 1905. No President of the Society, except Sir Roderick Murchison, had such a long, and few, if any, a more strenuous term of office. Clements Markham was for many years Secretary, and from 1890 to 1909 President, of the Hakluyt Society. He was made a Fellow of the Royal Society in 1873 and a K.C.B. in 1896. He was made Hon. Member of many foreign societies.

This bare recital of the work done, the offices held, and the honours received by Sir Clements Markham give but a faint idea of his personality and work. To those who knew him the outstanding features of his character were his enthusiasm for geographical exploration and science and his unquenchable energy. During his long and memorable tenure of the post of President of the Royal Geographical Society he devoted his great abilities and energy to the encouragement of exploration, to the fostering of scientific geography and to the improvement of geographical education. In these various branches great progress was made during his time.

He always took a keen interest in the exploration of South America and in geographical problems connected with that continent in which in his early days he had done such valuable work, but Arctic and Antarctic exploration held the first place in his affections, and he devoted himself heart and soul to encourage exploration of these regions.

It was largely due to his energy that the Arctic Expedition under Sir George Nares was fitted out in 1874, but it was to the National Antarctic Expedition under Lieut. R. F. Scott, subsequently promoted to Captain for his services on the expedition, that he devoted in greatest profusion his indomitable energy and his organising power, and with which his name is most intimately associated. The difficulties to be overcome in connection with the expedition were very great and would have damped the ardour of many men. It is not too much to say that but for his enthusiasm and energy the expedition would not have been nearly as complete as it was. The success of the expedition was largely due to Sir Clements' knowledge, experience, and organising power and to the judgment he showed in selecting Capt. R. F. Scott for the command.

Of late years, owing to increasing deafness and the infirmities of age, Sir Clements Markham was obliged to take a less active part in geo-

graphical work, and after 1912 his name disappeared from the Council of the Royal Geographical Society, on which he had in one capacity or another served for fifty years, but he never lost his interest and keenness in exploration and in everything connected with geography, and only a few months ago he prepared a valuable paper which only indisposition prevented him from reading personally to the Royal Geographical Society.

He will long be remembered as a great geographer, an authority on Arctic and Antarctic exploration, and one who did much to obtain for scientific geography a proper recognition in the country and to improve its teaching in our schools and universities. He was loved and revered by those who had the privilege of working with him, and those who knew him best appreciate most fully how much geography owes to him.

D. A. J.

GEOGRAPHICAL NOTES.

Europe.

Problems of the European War.—In a recently issued volume of the *Proceedings* of the Royal Philosophical Society of Glasgow (XLVI.), there are a number of striking articles on various aspects of the Great War, and on the problems to which it has given rise. Thus Professor Dudley Medley discusses the Races of Europe, giving a very clear and concise account of the different nationalities, and of the various suggestions which have been made for post-bellum reconstruction. In this paper the different races of Austria-Hungary receive especially full treatment. In regard to one of the difficult questions involved it is interesting to note that Professor Medley agrees with M. Georges Bienaimé (cf. p. 95) in believing that a reconstructed Poland should have an outlet on the Baltic at the expense of Prussia. In another article Professor W. Smart discusses the Economic Dislocation of the War, here and in Germany. He emphasises the broad resemblance between the trade of Germany and that of this country, for Germany imports about £160,000,000 of food-stuffs in normal years; she also imports raw materials to the value of some £300,000,000, and exports some £300,000,000 of manufactured goods. On the basis of an analysis of our pre-war trade with Germany he comes to the conclusion that most of the materials we have hitherto drawn from Germany could be made here, and most of the finished goods hitherto imported could easily be dispensed with. Two other articles are chiefly historical in outlook, these being one on Pan-Germanism by Mr. Andrew Cowan and one on the Dual Alliance and the Triple Entente by Professor Robert Rait. The volume contains a number of other interesting articles in addition.

Africa.

South-West Africa.—It is stated in the *Geographical Journal* for February that the Royal Geographical Society has been officially informed that what was previously known as German South-West Africa is, for

the present, "The Protectorate of South-West Africa in Military Occupation of the Union Forces," and for purposes of brevity, "The Protectorate of South-West Africa."

America.

Ground-Ice Wedges in Alaska.—Mr. E. de K. Leffingwell describes in the *Journal of Geology* a peculiar form of ground-ice which he has studied on the north coast of Alaska, and which he believes to be probably widespread. This consists of a series of ice-wedges occupying frost cracks, and having curious effects on the surface. When these wedges are exposed, as on the seashore, they may give rise to appearances which suggest a continuous horizontal sheet of ground-ice, and the author considers it possible that the various descriptions which have been published of such sheets may possibly rest upon a wrong interpretation of observations of a similar kind. The paper is copiously illustrated by diagrams and photographs, and the brief summary which follows gives the essential points.

On the north coast of Alaska the permanently frozen ground contracts during the winter, and cracks are formed which divide the surface into polygonal blocks. In the spring these frost cracks become filled with surface water, which immediately freezes. Expansion of the frozen ground takes place as the temperature rises in summer, and as the vein of ice, which is more rigid than the surrounding loose deposit of mud, does not yield, readjustment must take place in the latter. The result is to bulge up the block of tundra material enclosed by the ice, either bodily or else locally along the sides of the ice. During the next winter a new crack forms at the same spot, so that a continually growing wedge of ground-ice is formed, thickest at the top, and tapering away below. The result is the presence, about two feet beneath the surface of the ground, of a network of ice-wedges, which surround the general material of the tundra, and are themselves covered by tundra deposits, with turf at the surface. When the tundra is undercut by waves or running water, the ice-surrounded blocks break off in great masses, and, as the ice-wedge is left behind when this happens, it may, as already stated, appear as though a thick horizontal sheet of ice were present beneath the surface. Further, the effect of the ice-wedges, for the reason already mentioned, is to produce a distinct, though slight, surface relief, consisting either of raised polygonal areas, surrounded by a gentle depression, or elsewhere of depressions running between two parallel ridges, and surrounding a depressed block. These features, insignificant though they are, interfere with drainage, and by forming pools and swamps help to give the tundra its characteristic summer appearance.

Recent Developments in Jamaica.—Sir Sydney Olivier, late Governor of Jamaica, read a paper on that island before the Royal Society of Arts on November 30 last, and this paper is published in the *Journal* of the Society for December 17.

The period considered in the paper includes the last thirty years,

and deals with the recovery of the island from the depression due to the fall in the price of sugar, which was formerly Jamaica's staple. The effects of this fall in price are somewhat curious, and a brief consideration of the relief of the island is necessary before they can be appreciated. Jamaica, described by Sir Sydney Olivier as fish-shaped, has a central axis of mountains, composed of sedimentary rocks, some of which are of Carboniferous Age. The range emerges through the principal formation of the island, a white limestone, which lies at elevations varying from 4000 to 2000 feet downward, and forms in many places a high tableland broken by steep-sided gorges. In these deep gorges run the rivers, where they exist, but over much of the island the surface is without streams, the rain sinking through the porous limestone to emerge on the coastal alluvial plains. These alluvial plains form the third element in the relief. The largest is that in which Kingston, the capital, is situated, but many of the rivers are fringed by such deposits in the vicinity of their lower reaches. It was on these alluvial plains that the great sugar estates were placed, and in the earlier days each sugar estate had connected with it what was called a "mountain," that is, a tract in the limestone belt, miles away from the actual factory. In the mountain the slaves had their own provision grounds, there they retired when they were past work, there also freed slaves bought land. For negro agriculture the limestone lands are well fitted, and the uplands are also more suited for habitation than the low plains. When the sugar plantations began to fail, the tendency for the labouring population to seek the mountains became increasingly marked, and here many peasant landowners established themselves. The crops grown are of two kinds—food crops, chiefly yams and similar plants, and money crops, consisting of coffee, pimento, annatto, oranges, and other fruit. But for pimento and annatto the demand is limited, the price of coffee had fallen, and the market for oranges was precarious. Thus twenty or thirty years ago, poverty was considerable, and there was little margin for education, medical service, and so forth. A return of prosperity has come about in two ways. First, the labour set free by the failure of the sugar plantations has been absorbed on the adjacent Central American continent, partly in the construction of the Panama Canal, and partly in the development of fruit plantations there. Second, the growth of the banana industry in the island has done much to increase prosperity. The banana industry has been established and controlled, both in Jamaica and in Costa Rica, by an American trust. By far the larger part of the product goes to the States, and Sir Sydney Olivier states that the attempts to develop a banana trade between Jamaica and England have met with but little success, for most of the "Jamaica" bananas of trade come from Costa Rica.

The banana is cultivated on the alluvial lands which formerly produced sugar, and with the banana are associated coconut trees and cacao. The valley of the Plantain Gaden river is specially suitable as regards climate and soil for bananas, but unfortunately is much exposed to wind, which has proved very destructive. In 1903 a hurricane destroyed the banana fields, and it was then for the first time that the Liverpool

ships were filled with Costa Rica bananas, since the better quality Jamaican fruit was unobtainable. A great difficulty in regard to developing the Jamaican plantations has been further the want of labour, for, as already stated, the labour population had largely ceased to inhabit the zone where the plantations thrive best. A curious point, not fully explained in the paper, is that though the Jamaicans seem reluctant to work in the banana plantations of the island, they emigrate freely to work in those of Costa Rica, where, presumably, wages are higher. In Central America generally, indeed, fruit cultivation is being energetically pushed with American capital and Jamaican labour.

In addition to emigrating to work on fruit plantations the Jamaicans have found a profitable field for their labour in the Panama Canal zone, where wages are twice as high as in the island. With money earned in this way Jamaicans are sometimes able to start small banana plantations in the island, and thus the class of small landowners is increasing. At the same time strenuous efforts are being made to improve native agriculture, and thus increase the prosperity of the peasant. The object of the administration is to encourage the production of a number of crops, to raise the standard of production, and to improve breeds of domestic animals. Progress has been slow, owing to the conservatism of the negro, but the multiplication of agricultural societies has done much. In detail some interesting statements are made in regard to the difficulties met with by the administration. For example, petty dishonesty has been a great curse of Jamaican agriculture, and the account of the attempts to create a healthy public opinion in the matter are instructive. It is noted, however, that the stealing is not without some advantages: for it was the theft of eggs of improved breeds of fowls which first convinced the peasant that there might be something in the Agricultural Department's arguments, which he had previously regarded as "buckra foolishness."

Polar.

Official Report on Stefansson's Expedition.—We have received recently the *Report* of the Department of the Naval Service for the fiscal year ending March 31, 1915, which contains the official account of the Canadian Arctic Expedition under Mr. Vilhjalmur Stefansson, together with Captain Bartlett's diary for the period July 13, 1913, to April 22, 1914, to which is added a brief summary of events till the arrival of the *Bear* with the survivors of the *Karluk* party at Esquimalt on October 25, 1914. The official account gives, in a consecutive form, and with some fresh details, the whole story of the expedition, and of the various separated parties, up till the period when Mr. Stefansson sent back his supporting party after leaving Martin Point on March 22, 1914, for his trip over the ice. The further adventures of the Stefansson party are not detailed in the *Report*, but its safe return was chronicled here in vol. xxxi. p. 549. The return apparently took place too late to be recorded in the *Report*. The account there is illustrated by a sketch-map showing the drift of the *Karluk*, and, as already stated, adds a considerable number of minor details to those already published.

General.

Early Man in Western Europe.—Owing to the great interest aroused by Mr. Charles Dawson's discovery of the Piltdown skull, the Geological Department of the British Museum (Natural History) has issued recently a small *Guide to the Fossil Remains of Man*, describing in detail the Piltdown specimens, and the exhibit which has been placed in the galleries of the Museum to illustrate present knowledge as to the history of early man, and the characters of the different species of men. The *Guide* is admirably illustrated, and may be recommended as a brief summary of a highly important subject. Necessarily most of the points dealt with are matters of detail, which do not lend themselves to the purposes of a short abstract, but we may note among the more general questions the emphasis laid upon the fact that, while lemurs were numerous in early tertiary times in North America, no fossil remains of early man have been found in the American continent, a fact which suggests that man originated in the old world. Further, the author of the pamphlet, Dr. Smith Woodward, seems to incline to the idea that *Pithecanthropus erectus*, discovered by Dubois in Java, may have been a gigantic gibbon, and not an ancestor of man. In the human series, Piltdown man is placed first, and is ascribed to Upper Pliocene or Early Pleistocene time. Great stress is laid upon the characters of the lower canine tooth, and a very interesting illustration shows that this presents striking resemblances to that of the child in modern man. The description of Piltdown man is followed by accounts of the Heidelberg jaw and of Neanderthal man, the latter being regarded as a degenerate type, combining all the lowly characters which are occasionally found separate among races of modern men.

The American Geographical Society.—With the beginning of the present year the familiar *Bulletin* of the American Geographical Society disappeared, its place being taken by a larger periodical entitled *The Geographical Review*. In a note upon the change in the January issue it is stated that the change indicates an intention on the part of the society to improve its publications, to broaden the range and deepen the intellectual interest of its articles, and to give its notes and reviews a more scholarly quality. It is hoped especially to make the review a reservoir of geographical information for geographers and teachers, and thus to promote the cause of geographical education. The society receives no less than six hundred publications per month, either geographical or containing material of geographical interest, and the editorial staff is to work regularly and systematically through this mass of material and make the results available to its readers.

Among the contents of the January issue we note a very vigorous article by Professor J. Russell Smith, who, under the title of "The Oak Tree and Man's Environment," sets forward once again the arguments which he has already urged for a systematic development of "Tree-crop Agriculture" in the United States. Most of the article, which is admirably illustrated, is devoted to a description of the oak forests of

Portugal, and of the importance there of the cork industry and of the production of acorns for pigs. Professor Russell Smith argues that in many parts of the States the growth of oaks or chestnuts would be a far better mode of soil utilisation than the attempt to produce corn on unsuitable land, or on that of such steep slope that soil erosion becomes serious. He believes that in this way the meat supply of the States might be greatly increased, and fertile lands now used to produce forage for animals would be at the same time set free to grow human food directly.

Commercial Geography.

Railway Development in Northern Russia.—The establishment of the new Russian port of Alexandrovsk, which was discussed here on p. 95, has naturally aroused much interest in the railways of the northern part of the country, and their possible further extension. This interest is reflected in a number of articles in various French journals. We note especially one in *L'Information*, which was summarised in a recent issue of the *Scalsmen*, devoted to the Murman railway, one in the *Annales de Géographie* for January 15 on the same railway and its connections, and a more general discussion in the *Bulletin* of the Société de Géographie Commerciale de Paris (issue for October, November and December 1915).

The first two articles show that there are still considerable gaps in the Murman line, though these gaps can be at least partially filled by means of water transport. The first section, from Petrograd to Petrozavodsk on Lake Onega, has been finished for some time, and it was expected that by the month of February trains would be running regularly on the second section, that from Petrozavodsk to Soroka on the south-west arm of the White Sea. Soroka is at present a small fishing village with a good natural port, but it is hoped to make it an important junction of railway and sea traffic. From Soroka the railway is continued past Kem, another little fishing port on the White Sea, to Kandalaksha, placed on the north-westerly arm of the White Sea, at the base of the Kola peninsula. The Soroka-Kem section was expected to be finished in February, but the following section—Kem-Kandalaksha—presents great difficulties, on account of the marshy nature of the ground. It is hoped that this section may be completed during the present year, but meantime the service between Soroka and Kandalaksha is to be carried on by boat. The section from Kandalaksha to Kola presents only the difficulties due to the climate and the barrenness of the country, and is progressing rapidly. One great difficulty in construction has been the darkness, and the difficulty in obtaining satisfactory artificial light. Oil is impossible as the oils freeze at the temperatures experienced, and electric light is deficient in penetrating power in the dense, icy fogs which prevail. Acetylene dissolved in acetone has been employed with good results. Snow, of course, renders special precautions necessary, and although a form of snowshed is employed, the line has often to be cleaned by digging, and relays of

workmen are kept for this purpose in barracks along the line. The formation of ice on the rails renders it necessary to avoid heavy slopes, and to employ very powerful engines. But though the difficulties are great, the fact that the line touches the sea at several points made it possible to start construction in several sections, a great advantage.

The Murman railway itself is not, however, the only line in contemplation in this region, for it is intended to use the new port as an outlet for the produce of Siberia, and to link it up with other routes. Archangel is, of course, of much importance in this connection, and it is intended to create another port at the mouth of the Petchora, but both ports have the great disadvantage of being ice-blocked in winter, while Alexandrovsk is permanently open. As to possible railway connections, there already exists a line from Petrograd to Viatka, and thus to Perm and Siberia. Just before the outbreak of the war this line was continued to Kotlas, on the Dvina, connected in summer by large steamboats with Archangel. It is not proposed meantime to continue the line from Kotlas to Archangel, in spite of the winter interruption of navigation on the Dvina, but rather to construct a connecting branch with the Murman railway, by a line which would join Kotlas and Soroka, and thus put Siberia into communication by rail with the ice-free port of Alexandrovsk.

EDUCATIONAL.

The Railways of the Western United States.—The United States Geological Survey has been publishing recently a series of Guide-books of the western United States, covering certain of the railroad routes west of the Mississippi, and intended for the use of travellers. Of these one (B) deals with the Overland Route from Omaha to San Francisco, with a side trip to Yellowstone Park. The volume may be recommended to the notice of teachers who wish to give reality to text-book descriptions of trans-continental routes. It, like the other members of the series, is copiously illustrated both with photographs, sketches, etc., and also by map-sheets showing the different parts of the route, and though the geology of the country passed through receives most attention, a large number of interesting geographical facts find a place, and some of the short accounts of scenic features are admirable. There is also an index. We note especially a good description of the Red Desert in Wyoming, which is used as a sheep pasture in winter, owing to the nutritive value of the scattered "bunch grass" which cures naturally into hay where it stands. In summer the sheep have to be driven up to the mountain slopes in search of fresh grass and water, but when the snows begin to fall they migrate gradually downwards to the desert area, where the high winds keep particular tracts clear of snow. It is noted that here, as in arid areas generally, the control of the few water holes means control of the whole area. In earlier days it was the custom of the large stock owners to acquire rights to these, and thus to become the virtual owners of enormous areas of land. Recently the government

has attempted to break up this practice by creating public water reserves open to all stock owners, large and small alike. The description given affords an obvious opportunity for an interesting lesson on semi-arid areas generally, with a comparison of conditions in the Old and New Worlds, and it is only one of many such opportunities which the Guide-book has to offer.

The other volumes of the series are A, The Northern Pacific Route, with a side trip to Yellowstone Park; C, The Santa Fé Route, with a side trip to the Grand Canyon of the Colorado: D, The Shasta Route and Coast Line. All show similar features, and some of the illustrations are very striking. We note especially a fine view of the new crater of Lassen Peak, which forms Plate XXIII. in Part D.

NEW BOOKS.

EUROPE.

A Hilltop on the Marne: June 3, 1914—*Sept.* 8, 1915. By MILDRED ALDRICH. London: Constable and Company, 1915. *Price* 4*s.* 6*d. net.*

These "letters to a friend" have colour and atmosphere. They have the fascination of reality presented by an artist. How the war and its greatest battle called Old France to life you may read here in the vivid perceptions of a sympathetic American.

The Way of Martha and the Way of Mary. By STEPHEN GRAHAM. London: Macmillan and Co., 1915. *Price* 7*s.* 6*d. net.*

To explain the somewhat fanciful title of this interesting book, the author states in the Preface, written at Moscow last September, "Speaking roughly, Eastern Christianity is associated with Mary's good part and Western Christianity with the way of Martha and service." He considers that while the Saxon part of the English nature has an instinct for order similar to that of Germany, "the aboriginal Celtic base in us, with much that came over with the Normans, has frustrated the Saxon element in our race. The British earth itself has formed us, inspired us; hence our kindliness, verve, and imaginativeness, human tenderness. Thanks to the ancient Briton in us, we are more like the Russians than the Germans."

After describing his visit to Kief in January 1914, when he saw a play by Artsibashef, which "reflects the growing non-Christian Russia," he went to Moscow and saw the novelist Maxim Gorky, whose attacks on the popular novelist Dostoieffsky had no effect on the Russian people. He visited the most famous public-house in Moscow, the *Yama* or Pit, which is especially resorted to by the Bogoiskateli or "seekers after God." He speaks of sitting there and talking for six and a half hours over two glasses of tea. "The talk went on and on, as it goes on every day and hour in Russia in every town or village—talk about God and the idea of Christ and suffering, of what is necessary and what not." "The tavern swarmed with religious characters—home missionaries, propagandists, Bible-hawkers." Russians have made even taverns into something like free churches or open debating societies.

Remarking on "the many ruins of abbeys in England," the author says,

"Throughout the wide stretch of Russia there is not a single Christian ruin." "Russia and England," he declares, "are akin, if it were only in the bond of Christianity. We have certain spiritual affinities." But Russia "has much more to teach us than we have to teach her." "Russian Christianity is sharply in contrast with Western Christianity in the characteristic idea of denial of 'the world,' as opposed to our Western idea of accepting the world and 'making the best of it.'" In Tolstoy's flight from his home he "sought sanctuary from the world."

The book is written so beautifully as to disarm criticism, but the author carries his allegory far when, leaving Russian analogies, he compares Ruskin to Martha because he insisted that artists must work, and Whistler to Mary "because he obviously did not work." He continues: "Mr. Lloyd George, with his care for the poor, is a Martha. Mr. Bonar Law is a Martha also. H. G. Wells, with his *World Set Free* and his rooms with rounded instead of squared corners to help the women to sweep, is a Martha. Our poets are not Marys, and it is necessary to go to Francis Thompson or Rossetti to find a mystic poet." As for our painters there is, according to him, no mystical portrait painter since Watt died.

Allegory apart, this volume, like all Mr. Graham's Russian books, is instinct with love of Russia and the Russians, the gallant race to whom we are so deeply indebted in the present war. He presents the Russians to us with all that mystical portrait-painting of which he is an acknowledged master.

Edinburgh. By R. L. Stevenson. London: Seeley, Service and Co., 1915. *Price 6s. net.*

This is an attractively got up edition of Stevenson's well-known book, and has twelve illustrations in colour by Mr. James Heron. The price is moderate, and many will be glad to renew their acquaintance with Stevenson's phrases and word-pictures in this pleasant form.

The Aspirations of Bulgaria. Translated from the Serbian of Balkanicus. London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd., 1915. *Price 2s. 6d. net.*

This interesting book may be said to be the equivalent, from the Serbian point of view, of M. Guéchoff's volume which we reviewed here in vol. xxxi.-p. 665. It contains first a history of June 16, 1913, the day on which Bulgaria treacherously attacked her allies, the Greeks and Serbs, and of the events which led up to that attack, and here supplements in an interesting fashion Guéchoff's accounts. This chapter is followed by discussions of the treaties, military conventions, and so forth, arranged between Serbia, Greece, and Bulgaria, before the First Balkan War, and here again we find some curious details added to the facts given in *L'Alliance Balkanique*. Finally, there is a long section on the Bulgarians and Macedonia, which includes a full discussion of the disputed question of the nationality of the Macedonians, with special reference to their language. As regards this question an interesting quotation is given from a Russian author, Alexander Amphitheatrov, from which we quote the following phrases: "They (the Macedonians) are neither Serbians nor Bulgarians, but an originally Slav people with a simple language that is in a high degree susceptible to modification by the influence of any of the more advanced types of Slav culture. The Macedonians are Bulgarians only where Bulgarian schools and churches have been established, and Serbians wherever education and letters are in Serbian hands."

But the most striking part of this section of the book is the evidence which it affords of the trend of Bulgarian policy long before her entrance into the present war. We note especially that on February 26, 1915, the Russian *Novoe Vremia* published an interview between a Bulgarian politician and the editor of the *Preussische Zeitung*, in which the former is stated to have used the following words: "Every one of us would rather give his life than allow Russia to seize Constantinople . . . indeed we should consider it our duty to range ourselves beside the Turks in the defence of Constantinople against Russian expansionist ambitions." The significance of this zeal to defend the Turk is made plain when we learn that there has long been a party in Bulgaria which desires to abandon Bulgarian claims in Macedonia in favour of Austria, on condition that Bulgaria is permitted to advance to the Bosphorus. Indeed it is stated that so long ago as 1898 Ferdinand of Bulgaria concluded with Austria-Hungary a treaty whereby Bulgaria abandoned all claim to territory lying west of the Struma valley and the Rhodope chain, Austria in return promising to recognise Bulgaria's claims to Eastern Serbia, and to help her to obtain territory there.

We cannot discuss further here the numerous other interesting points contained in the book, but may note that, no less than Guéchoff's book, it is somewhat confusedly arranged; further, it has no index, neither the name of the translator nor of the author is mentioned, and though references are given they are not always so precise as one would wish. Generally the book, no less than *L'Alliance Balkanique*, supplies some of the raw material for a history of the events described rather than forming itself a history. But taken for what it is, it is an extremely interesting contribution to the literature of a highly complex subject. It affords also one other proof of the fact that, whatever the issue of the war, the reconciliation of the different Balkan interests may well seem a hopeless task; and the expulsion of the Turk, if he be finally expelled, does not seem likely to facilitate the task of the diplomatist striving to bring permanent peace to the peninsula.

Some Frontiers of To-Morrow: An Aspiration for Europe. By L. W. Lyde, M.A., F.R.G.S. London: A. and C. Black, Ltd., 1915. *Price* 2*s.* 6*d.*

This little book is a serious contribution to the fast-growing literature dealing with the reconstruction of Europe. Coming from the pen of such an eminent geographer as Professor Lyde, the volume, both in its principles of reconstruction and in the reconstructions themselves, deserves careful attention, and the reader who studies the seven chapters will, we think, come to the conclusion that the distinguished author is sounder in the former than in the latter. No one will venture to quarrel with the three articles of belief which Professor Lyde enunciates in his introductory chapter, while Chapter III., The Geographical Kernel, and Chapter IV., The Power of Assimilation, are in every respect admirable. On the other hand, the application of the principles to the northern and southern frontiers is in many cases somewhat arbitrary. We agree with Professor Lyde over the Alsace-Lorraine line of demarcation and in his abolition of the Dutch enclave south of the Scheldt estuary, but we stop there in the western reconstruction. The Schleswig rectification is in the main fairly sound, but we cannot see the need for the erection of a kingdom of Hanover. The Polish frontier and the Austro-Italian reconstruction are sound, except in so far as they deal or fail to deal with Danzig and Trieste. In the question of the Balkan reconstruction Professor Lyde should be speaking from accurate knowledge, for he is joint author of a standard text-book on the military geography of the peninsula. We leave the reader to judge

whether they are satisfied with his retention of the Rumano-Hungarian frontier, the maintenance of Albania, and the settlement of the Macedonian problem.

Of this there can at least be no doubt, Professor Lyde has succeeded in making us think more about the great settlement, and we recommend his book to all who desire to take their fair share in bringing about a reconstruction which shall be fair, national, and permanent.

The New Europe. Some Essays in Reconstruction By Arnold Toynbee. London: J. M. Dent and Sons, 1915. *Price* 1*s.* 6*d. net.*

Mr. Toynbee is already known to most serious students of the war as the author of the ablest attempt to deal with the great problem of nationality and its bearing on the causes of the conflict, and on the reconstruction of the future Europe. The seven essays, six of which have appeared in the *Nation*, are not, as the sub-title might suggest, definite efforts to show reconstructions or rectifications of frontiers, but more or less general discussions on underlying principles. To attempt to summarise the altogether excellent essays would be vain. Mr. Toynbee's easy style, accurate knowledge, sound reasoning, combine to form a deep impression on the reader's mind, and to clarify his thoughts about the tangled problems concerning the war. The pity of it is that the writer did not show the application of his principles to other localities besides the Ukraine. He could have done this by adding to the present book a summarised form of the reconstructive chapters of his larger work, which at its present price is somewhat beyond the reach of those very readers Mr. Toynbee doubtless wishes to influence.

Rambles about the Riviera. By Frances M. Gostling. London: Mills and Boon, Ltd., 1915. *Price* 6*s.*

This is one of the most attractive books ever published on one of the most attractive parts of Europe. Not only is it written in a simple but graphic style, but also it is illustrated by reproductions of 42 fine photographs by Dr. W. Ayton Gostling. The authoress describes the Riviera in autumn, when strangers seldom visit it, and she recommends it at that season because of its splendid fruits, its gorgeous sunsets, and because the people are then so pleased to see visitors. We observe that although she describes the Lérins Islands, near Cannes, she does not refer to St. Patrick having been a monk in the ruined monastery there. She mentions that, when visiting the famous *Rochers rouges* prehistoric caves and skeletons across the Italian frontier, near Mentone, she "picked up a fragment of bone here and there, or an unfinished knife or point," which shows that the caves were not so jealously guarded as when the present writer visited them and saw the *Gardien* compel a visitor, who had surreptitiously pocketed a pebble, to deliver it up.

The History of the Provence of Cat (Caithness and Sutherland) from the earliest times to the year 1615. By the late Rev. Angus Mackay, M.A. Wick: Peter Reid and Co., Ltd., 1914. *Price* 10*s.* 6*d. net.*

This volume doubtless represents years of toil, and the ground covered is "before the dawn" to the beginning of the seventeenth century. Lord Reay, in a foreword, states that "the book abounds with interesting points for those who care for local history, and the author has handled his subject so as to make it a contribution to national history." The subjects dealt with are—archæology, the coming of the Norsemen, church history, place names, and clan conflicts. The area covered extends to over 2838 square miles, and it has a coastline of at least 240 miles. The eastern section, *i.e.* Caithness, was doubtless peopled at a very

early period, but the extreme north-west could have been but sparsely populated when this record ends, for Timothy Pont—one of the earliest geographers of these parts (about 1600)—writes in his map : " This is extreme wilderness."

The archæological section is chiefly based on the excellent work of Dr. Anderson, but this is now completely superseded by the exhaustive survey made by Mr. A. O. Curle, under the auspices of the Royal Commission on Ancient Monuments. Much light is thrown on the development of the early church in these northern regions, but one would expect a more detailed and connected history of Dornoch Cathedral, the Church at Durness, and the many Annats scattered over the district.

The numerous references to Strathnaver, both in this volume and by early geographers, shows that there was a considerable population here, and it is a matter for regret that this, and many another glen and strath in the Highlands, had, for economic reasons, been completely depopulated in the early years of the last century.

The treatment of the place names is disappointing. Guesses at derivations are always unsatisfactory. The business of the historian and geographer should be to collect all the facts, such as old forms and present usage, and these should be left to the trained philologist for the derivation and meaning.

The writer, for instance, derives Loch mo Nàire and Loch Naver from the same root, ignoring the important fact of local usage, which clearly shows the two names have nothing to do with each other. " Cat," the name of a tribe, is constantly used for Cataibh, the name of the district—*i.e.* Caithness. And we are told that Dunnet can be compared with Dinnet, in Aberdeen, and Dunadd, in Argyll, a statement which no philologist familiar with local usage would support. Thurso is in Gaelic Inbhir-thèorsa—not thìrosa. Doubtless the book has suffered for want of final revision owing to the author's death.

Interesting chapters are the " Conflict of the Clans," and the " Struggle for superiority."

ASIA.

Fifty Years' Work in the Holy Land: A Record and a Summary, 1865-1915. By Colonel Sir G. M. Watson. London : Palestine Exploration Fund, 1915. *Price* 3*s.* 6*d.*

We have in this book a brief and succinct account of the labours of the Palestine Exploration Fund during the past fifty years. The society celebrated its jubilee last year (1915) ; and it was fitting that its record of service should be given in one compact whole. In various publications and in its *Quarterly Statement*, published since 1869, details of exploration and other matters pertaining to the Holy Land have been set forth. But Sir C. M. Watson has produced a most interesting summation of the fifty years' efforts, and enables one to see at a glance what excellent work has been done in uncovering the lost cities of Palestine. It is by no means a dry statement of bald facts, but a fresh and living account. The fund has raised in the half-century of its existence nearly £140,000, £62,000 of which has been spent on surveys and exploration. The book is furnished with a fairly good index, and a map of Palestine and the Sinaitic Peninsula.

Atlas of the Historical Geography of the Holy Land. By George Adam Smith and J. G. Bartholomew. London : Hodder and Stoughton, 1915. *Price* 25*s. net.*

This important and admirably executed work has been long on the stocks. The distinguished authors explain that it was originally planned in 1894 ; but the

long delay has enabled the researches of the last twenty-one years to be made use of, and in view of the political developments in the Turkish Empire its appearance is opportune now. It contains altogether 60 plates and 32 pages of introductory and explanatory text.

The maps are not confined to Palestine but relate to the whole of the ancient world, and describe the empires that have existed round the shores of the Mediterranean during the last thirty or more centuries. Plates 3 and 4 show the extent of the five great empires of antiquity in this part of the world. The Egyptian Empire of 1450 B.C. and the Babylonian Empire in 560 B.C. both included Palestine as part of their possessions, but the latter did not comprise any part of Egypt beyond the Gulf of Suez. The Persian Empire was much larger in 525 B.C., and extended from the Indus to the Ægean, and included Palestine and Lower Egypt. This whole region was taken by Alexander the Great, who also ruled over the greater part of the Balkan Peninsula in 325 B.C. His dominions included the whole of the later Turkish and Persian empires.

The Roman Empire in the third century A.D. did not include Persia but ended at the mouth of the Euphrates and the shores of the Caspian on the east, and was washed by the sea on most of its boundaries, and by large rivers on the northern side between the Crimean coast and the mouth of the Rhine. Palestine was geographically near the centre, and the thin strip of habitable coast between the eastern desert and the sea that was so much coveted by these old conquerors was a strategical point of importance from the earliest times.

It is neither geologically nor agriculturally an important country, but its holy associations and its geographical position give it peculiar interest to all Christian and intelligent minds. Under a benevolent and intelligent government the Holy Land is capable of being greatly developed and improved as Egypt has been since the Turkish blight has been removed. These beautiful maps show the areas that are capable of cultivation, and no doubt much more can be done to conserve the water-supply in the upper valley of the Jordan than will ever be attempted under the present miserable régime. There will doubtless be a change of rulers before long, and the war may be the beginning of a new lease of life to the land that has so long lain desolate, the cockpit of ancient battles and the meeting-place of east and west. An atlas such as this, with the most recent physical and historical researches embodied in its pages, and printed in the finest style of modern cartography, is a work of reference of the highest value.

AFRICA.

Savage Man in Central Africa. A Study of Primitive Races in the French Congo. By Adolphe Louis Cureau, Gouverneur Honoraire des Colonies. Translated by E. Andrews. London: T. Fisher Unwin, 1915. *Price* 12*s.* 6*d. net.*

Comprehensive yet concise, scientific yet picturesque, this treatise will immediately take a place among standard works on ethnology. The author has addressed himself to his task equipped both with industry and understanding, and his style is characterised by true Gallic clarity. The work is divided into three books. The first deals with the Congo races and their environment, and may be described as a very brief but adequate introduction, mentioning the different peoples and outlining the geography of their habitat. In Book II. we come to the psychology of the individual, and such subjects as appetites, fickleness, honesty, merriment, negro intelligence, and the aesthetic sense are discussed. The last book occupies more than two-thirds of the volume and treats of society,—first, the family; secondly, the village; and thirdly, organisations superior to the village.

There is an excellent index—somewhat of a rarity in French books!—while the numerous illustrations, diagrams, and a map are most helpful. The translator's work is really excellently done. The book merits a lengthy review, and this it will no doubt receive in ethnological magazines. From the point of view of the geographer it is interesting to note that while formal geography occupies only some seven pages, yet time and again throughout, phases of character, stages of development, tribal peculiarities—to mention but a few instances—can only be fully explained by reference to geographical environment.

South-West Africa during the German Occupation, 1884-1914. By Albert F. Calvert, F.C.S. London: T. Werner Laurie, Ltd., 1915. *Price* 3*s. net.*

This volume is represented as "some sort of personal service" by one over military age who ventures "to hope that a useful purpose will be served by providing the British public with reliable information concerning the various German and ex-German dependencies, and indicating the lines along which they may be most profitably developed, after the curse of Teutonic *kultur* and militarism has been swept away." The contents are largely of summaries of other publications, and though the book contains a mass of valuable and interesting material, it is neither very well proportioned nor very well arranged. Of the 105 pages of reading matter, 38 are devoted to the diamond industry, while only 18 are given to the country and its resources, although the writer tells us (and all competent authorities are agreed) that the future importance of the area lies in stock-raising. German and British measures of length, area, and money are used in different parts of the book, and Luderitzbucht is preferred to Luderitz Bay. The 223 plates which form the second part of the book give a realistic summary of the geography of the country. At the end of the volume are five sections across the region, and three maps. Taken altogether, the volume provides ample material from which to gain an adequate notion of the interim protectorate, but the geographer reads it with a somewhat unsatisfied feeling.

The Guide to South and East Africa. For the use of Tourists, Sportsmen, Invalids, and Settlers. With coloured Maps, Plans and Diagrams. Edited annually by A. Samler Brown and G. Gordon Brown. 1916 edition. London: Sampson Low, Marston and Co. *Price* 1*s.*

The changes in this as compared with the last edition seem chiefly to concern the arrangement, which has been modified in various ways, especially with a view to facilitating reference to the different subjects discussed. But the book has been brought up to date, and contains, *e.g.*, a short account of the South African Rebellion in 1914-15, and of the successful campaign against German South-West Africa.

AMERICA.

The Red Indians of the Plains—Thirty Years' Missionary Experience in the Saskatchewan. By the Rev. J. Hines. London: S.P.C.K., 1915. *Price* 6*s. net.*

As the Chronicle of the work and adventures of a devoted and successful pioneer missionary—a man of grit and a practical philanthropist—this volume is a distinct success. In spite of, or because of the author's lack of the usual academic training, his narrative is characterised by a charming Defoe-like simplicity and directness and particularity: at times, in the more stirring adven-

tures, one could imagine himself reading Defoe's great classic. At the same time, it must be said that in these crowded days of ours some condensation of the chronicle would not have been a fault ; likewise that the learned writer of the commendatory Preface, without being a syntactical purist, might well have used his blue-pencil as he read over the story.

"The Saskatchewan" of the title is not defined, and indeed greater geographical definiteness throughout would have been an improvement. We gather that "the Saskatchewan" is not the province Saskatchewan, old or new, but the region of the North Saskatchewan river from the junction near Prince Albert to this side of Edmonton in Alberta, a stretch of three hundred miles more or less. The "thirty years' experience," from 1874 onward, covers the interesting period when the virtual extinction of big game drove the Red Indians to consent to be transformed by a generous paternal government from hunting nomads into agriculturists settled in "reserves." As an ex-farmer and a trusted European friend, a "praying-master," not a "trading-master," *i.e.* "company officer," Mr. Hines was the right man in the right place. He also came through the half-breed and Indian rebellion of 1885, when, as was to be expected, all within his mission sphere remained loyal.

Mr. Hines' personal narrative is of value because of the first-hand information it affords about the Red Indians before white settlements engulfed them and obliterated their individuality. The information is perhaps all the more valuable because it does not profess to be systematic.

GENERAL.

Sport, Travel, and Adventure. Edited by A. G. Lewis. With 58 Illustrations. London : T. Fisher Unwin, Ltd., 1915. *Price* 10*s.* 6*d. net.*

We can scarcely imagine a better present for a boy than this collection of tales of adventure. No fewer than 54 original sources have been drawn upon, and all parts of the world are touched in rapid succession. The book is well printed and copiously illustrated. The only fault we can find is that the photograph reproduced opposite page 174, taken from Mummery's *My Climbs in the Alps and Caucasus*, and illustrating the famous Grépon "crack," is not referred to in the text.

Romany Life, Experienced and Observed during many Years of Friendly Intercourse with the Gypsies. By Frank Cuttriss. London : Mills and Boon, Ltd., 1915. *Price* 7*s.* 6*d.*

Mr. Cuttriss is believed by his friends the gypsies to have a good deal of the Romany in his composition. In any case, his knowledge of their tongue and adaptability to their manner of life has enabled him to present us with a faithful and most interesting account of the character and customs of the *Tachoy Romany* or pure-blooded gypsy, a very different being from the *Chorodie*—tramp or tinker —with whom by ignorant people he is often confounded.

The suspicious, unapproachable attitude of the gypsy to the ordinary *Gorgio* is at once the cause and the effect of the prejudice in which he is held by many people, and of the harsh and unjust treatment to which he is often subjected. But to those who, like Mr. Cuttriss, really know and understand him, the gypsy is one of the truest and best of friends, and the possessor of many fine qualities.

Physical characteristics, peculiarities of dress and ornament, and especially language—all point to the oriental origin of this curious people, who first appeared in western Europe early in the fifteenth century, and reached England about the year 1480. The close similarity of many Romany words to Hindustani and

Sanscrit is shown in the vocabulary given at page 17. The author also considers that an unusual gift of "unconscious telepathy," derived from their Indian ancestry, may account for their uncanny powers of insight into the characters of those with whom they have dealings.

The book contains a number of beautiful photographs of the people, their daily life and surroundings.

Hazell's Annual for the Year 1916. *A Record of the Time.* Edited by T. A. Ingram, M.A., LL.D. Thirty-first year of issue. London: Hazell, Watson and Viney, 1916. *Price* 3*s.* 6*d. net.*

Heaton's Annual. The Commercial Handbook of Canada, and Boards of Trade Register. Twelfth year, 1916. Toronto: Heaton's Agency. *Price* 5*s.*

These two Annuals show for the most part the usual features with certain modifications and improvements in each case. In the case of the first the Great War has naturally absorbed a considerable amount of space, and among its effects we notice that Egypt, the new South-West Africa Protectorate, and the former German Pacific Colonies now appear under British Possessions. In regard to what was formerly German South-West Africa it is stated that the Union Government are engaged in the preparation of plans for the settlement of farmers from other parts of the Union in the area. In *Heaton's Annual* a notable feature is the development of the section which forms a guide to Dominion and Provincial Government Reports and Standard publications. This is really an index to Standard publications on Canada, official and non-official, and will be found very useful to those in search of information on special points.

EDUCATIONAL.

Notes of Lectures on Map Reading and Sketching. By Courtney Terrell. London: Gall and Polden, Ltd., 1915. *Price* 1*s. net.*

These notes, as the compiler, who is a Second Lieutenant of the Inns of Court O. T. C., explains in his Preface, "have been prepared to save the time of officers and others attending any lectures." Clear, to the point, and not too detailed, the notes admirably serve their purpose. Map-reading is a subject with which every officer should be more than familiar, and here we have at our disposal the elements in a simplified, convenient form.

The Ideal Regional Geographies. Part I. General Introduction. Glasgow and London: The Grant Educational Co., Ltd., 1915. *Price* 6*d. net.*

This forms a handy little summary of the general geography of the world, though the British Isles are treated with a fair amount of detail. The type is very clear, a number of photographic illustrations is added, and exercises are given on each chapter. A feature of the book is its series of orographical maps coloured in green and blue.

Map Reading: A Self-Instructional Manual. By L. Norcock, Captain R.M.L.I., and F. S. Wilson, Captain R.M.L.I. London: Sifton, Praed and Co., Ltd., 1915.

Many text-books intended to be of practical value to students are overloaded with theory which is difficult to grasp as mere theory. Only the actual working of examples illustrating points of theoretical importance can give a thorough grasp of principles involved, and the two captains who have compiled this manual have

kept the practical aim steadily in view. The book, which is divided into two parts, will be useful to young officers, and a conscientious working of the numerous exercises should be productive of much good to them.

The first part of the volume is mainly theory, dealing with such subjects as Scales, Definitions, Methods of Showing Hill Features, Use of Service Protractor, True and Magnetic Bearings, Setting of Maps, and Visibility of Points. Accompanying the theory, which is in clear and easily remembered language, are illustrative examples. The second part consists of selected questions and sets of examination papers based on the principles enunciated in the theory. The questions are carefully graded, and no typical question on military topography is omitted. To justify the sub-title of their book, the authors have given clear and accurate solutions to all the examples. Maps and diagrams are freely used to make every point clear. While the book is intended for those desirous of attaining skill in military map-reading, teachers of geography preparing pupils for the Higher Leaving Certificate will find many questions suitable for their practical work. The manual is to be heartily commended for its conciseness, clearness, and practical utility.

BOOKS RECEIVED.

East Lothian. (Cambridge County Geographies.) By T. S. Muir, M.A., F.R.S.G.S. With Maps, Diagrams, and Illustrations. Crown 8vo. Pp. viii + 117. *Price* 1*s.* 6*d. net.* Cambridge: University Press, 1915.

Memorial Volume of the Transcontinental Excursion of 1912 *of the American Geographical Society of New York.* Demy 8vo. Pp. 407. Published by the Society. New York, 1915.

Heaton's Annual: The Commercial Handbook of Canada and Boards of Trade Register, 1916. Crown 8vo. Pp. 506. *Price* 5*s.* Toronto: Heaton's Agency, 1916.

The Origins of the War. By J. Holland Rose, Litt.D. Crown 8vo. Pp. 201. *Price* 1*s. net.* London: Cambridge University Press, 1915.

My Slav Friends. By Rothay Reynolds. With 16 Illustrations. Demy 8vo. Pp. vii + 312. *Price* 10*s.* 6*d. net.* London: Mills and Boon, 1916.

Poland. By W. Alison Phillips, M.A. (Home University Library.) Crown 8vo. Pp. 256. *Price* 1*s. net.* London: Williams and Norgate, 1916.

The New Science. By Rev. Frank R. Burrows, M.A., F.R.G.S. Crown 8vo. Pp. 32. *Price* 6*d.* London: George Philip and Sons, Ltd., 1916.

Report on the Administration of Bangalore, 1914-1915. Bangalore, 1915.

Annuario Statistico Italiano, 1914. Rome, 1915.

Report on the Administration of Burma, 1914-1915. Rangoon, 1915.

Statistical Abstract relating to British India, 1904-5 *to* 1913-14. London, 1916.

Diplomatic and Consular Reports.—Maryland, Virginia, and West Virginia (5543); Boston (5542); Odessa (5544); Porto Rico (5475); Savannah (5548); Hankow (5551); Society Islands (5552); Bahrein Islands (5555); Lourenço Marques (5558); Tangier (5559); Tachienlu (5561); Corunna (5563).

Colonial Reports (Annual).—Uganda (873).

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

NEW MAPS AND ATLASES.

EUROPE.

ENGLAND.—BACON'S MAP OF RIPON. Scale half-inch to a mile. Showing Roads in colour. Price 6d. net. On cloth, 1s. net.

G. W. Bacon and Co., Ltd., London.

BALKAN BATTLE AREAS.—The *Daily Telegraph* War Map. Scale 9 miles to an inch. Contour colouring. By Alexander Gross, F.R.G.S. Price 1s. net. 1916.

"Geographia" Ltd., London.

ASIA.

INTERNATIONAL MAP.—Scale 1 : 1,000,000 or 15·78 miles to an inch. 1914.

Bombay Sheet.—North E, 43. Price 2 rupees.

Survey of India Office, Calcutta.

INDIAN GOVERNMENT SURVEYS.—

India.—Showing Railways open and under construction. June 1914. Scale 1 : 4,055,040 or 64 miles to an inch. Price 1 rupee 8 annas.

India and adjacent Countries.—Scale 1 : 1,000,000 or 15·78 miles to an inch. 1914.

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„ 92—Assam, Burma, etc. (second provisional issue).

Provisional Map of Bengal.—Scale 32 miles to an inch. 1915. Price 1 rupee 4 annas.

Southern Asia Series.—Scale 1 : 2,000,000 or about 32 miles to an inch. 1914. Price 3 rupees each sheet.

Afghanistan Sheet—(1) layered and shaded ; (2) layered only ; (3) shaded and boundaries.

Baluchistan Sheet—(1) layered and shaded ; (2) layered only ; (3) shaded and boundaries.

Quarter-inch Survey Map of India.—Degree Sheets. Scale 1 : 253,440 or 4 miles to an inch. Revised 1914-15. Price 1 rupee each sheet.

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„ 63-G, 63-H, 63-K, 63-L, do.
„ 64-D, 64-O, 64-P, do.

Sheets 65-A, 65-K, 6 L, Provisional Issues.
„ 65-M, 65-N, 65-O, do.
„ 74-A, 74-B, 74-E, 74-I, do.
„ 78-G, 78-H, 78-J, do.
Sheet 85-M, Provisional, (1) layered and shaded; (2) layered only; (3) shaded only.
„ 94-F, 2nd Edition, (1) layered and shaded; (2) layered only; (3) shaded only.

Survey of India Office, Calcutta.

AMERICA.

WESTERN CANADA.—Topographical Map of the Rocky and Selkirk Mountains between Lat. 50° 37′ N. and 51° 44′ N.—Long. 115° 55′ W. and 118° 21′ W. Scale 1 : 125,000 or about 2 miles to an inch. J. E. Chalifour, Chief Geographer. 1914. *Department of the Interior, Ottawa.*

A great improvement on previous maps of this region. It is engraved with contouring in similar style to the U.S. Survey Sheets on same scale.

AFRICA.

CENTRAL AND SOUTH AFRICA.—Bartholomew's War Map. Scale 1 : 5,000,000. Political colouring. 1916. Price 2s. 6d., or mounted on cloth 3s. 6d.
John Bartholomew and Co., Edinburgh.

GERMAN EAST AFRICA.—Sifton Praed's Map. Scale 1 : 2,500,000 or 40 miles to an inch. 1916. Price 2s., or mounted on cloth 3s. 6d.
Sifton, Praed and Co., Ltd., London.

GERMAN EAST AFRICA.—Sketch Map with surrounding territories. Scale 1 : 2,587,000 (Stanford's War Maps, No. 15). 1916.
Edward Stanford, Ltd., London.

AUSTRALIA.

NEW SOUTH WALES.—Geological Map. Scale 16 miles to an inch. Prepared under the direction of E. F. Pittman, A.R.S.M., Government Geologist, 1914. Two sheets. Price 10s. *Department of Mines, Sydney.*

VICTORIA.—Geological Maps of the Parishes of Bungil, Granya, Keelangie, Mudgeegonga, Tatonga. Scale 40 chains (half a mile) to an inch. 1915.
Geological Survey of Victoria, Melbourne.

ATLASES.

BACON'S CONTOUR ATLAS.—Price 6d. Special editions. 1916.
South-West England Edition.
East Anglia Edition.
Northern Wales Edition.
G. W. Bacon and Co., Ltd., London.

The above are provincial editions of this elementary school atlas which we have already noticed. They each contain four special maps of the districts dealt with.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE STRATEGIC GEOGRAPHY OF THE BRITISH EMPIRE.[1]

By Vaughan Cornish, D.Sc., F.R.G.S.

§ 1. The Principles of Strategic Geography.—During the Russian retreat from Poland in the summer of 1915 we were repeatedly assured by critics of repute that, the only true objective in war being armed forces, places do not matter. On the other hand, we have the dictum of Napoleon that "War is an affair of positions." This saying is illustrated by another of his maxims, viz., that "The greatest secret in the art of war is to make oneself master of the lines of communication," which are the routes leading from the bases to the Army in the field. The dependence of an army on its bases is greater and more immediate now than in former wars on account of the weight of ammunition. But, between the eastern frontier of Poland and the great cities of Russia, where munitions are produced, there extends a belt of country about three hundred miles wide, so that what the critics said was correct for the particular case: for more places could have been abandoned without disaster, as the routes to the manufacturing towns, and to the ports of Archangel, Vladivostock, and Dairen (formerly called Dalny) beyond, were not exposed to attack. The saying that places are not a true objective has, however, been over-emphasised in recent years, and is likely to mislead, if left unchallenged. Perhaps the ready abandonment of Pretoria by the Boers and the prolonged resistance of their small army in a wide country may have had something to do with the tendency to belittle the importance of positions.

If it were true that "places do not matter" in war, in the sense that no position is a sound objective, Naval and Military Geography would

[1] A paper read before the Society in Edinburgh on January 27, 1916. It appears in the February issue of *United Empire* and is reproduced here by kind permission of the Editors.

be merely such description of the natural and artificial features of the earth's surface as is necessary to acquaint members of the fighting services with the nature of their theatre of operations. But the topographical relation of the base, the field force, and the line of communication connecting them makes strategic geography a specialised subject with its own problems, requiring and rewarding detached thought. A knowledge of general geography provides material for such thought, but is not a substitute for it.

Strategic geography is, of course, the study of geography in relation to strategy. The great game of strategy goes on both in peace and war. During the period of hostilities it has to do with choosing the line of advance or position of defence, and directing the assembly and supply of forces there. The best single criterion of successful war strategy is superiority of concentration.

In accordance with these considerations I shall in this paper deal chiefly with three geographical conditions, viz. :—

1st. *The Situation of Naval and Military Resources.*—The supply of men and food is drawn from wide areas, and that of munitions from towns. Moreover, it is very difficult to shift factories, and in war time generally impossible, so that the situation of the *technical* bases is the chief matter requiring detailed geographical study.

2nd. *The Routes of Traffic.*—These are the avenues by which human movement proceeds, which are restricted by surrounding obstacles. In war they become known as the lines of invasion and lines of communication, the latter always leading from the army to its bases, the former generally towards the main base of the enemy.

3rd. *The Positions where Traffic necessarily Concentrates.*—If the map be examined with an eye to traffic it will be found that it consists of large areas where the possible routes are numerous and widely spread, so that, if one line of communication be cut, the supplies can be diverted to another, and small areas where surrounding obstacles compel all traffic to pass along a narrow avenue, the Lines of Communication leading from many bases coalescing in one common defile. These small areas constitute most of the strategic positions of the world. The sea-defile, or Strait, is particularly important because the approach of the opposite shores generally makes the position one which is not only a crossing place of traffic, but of the two kinds of traffic, land and sea, and hence of importance to the operation of both fleets and armies. Every defile causes a joining, crossing, and deflection of routes. Each junction, cross-ways and pivot (*i.e.* turning point) of routes has some strategic importance, even though it be not situated at a defile.

§ 2. Strategic Grouping of British Lands.—A terrestrial globe gives a correct representation of the relative dimensions and positions of the lands of the British Empire, which no map can do, and in order to acquire facility in thinking on our strategic problems it is desirable that the use of the globe should become a habit among our citizens. It is not necessary to set apart time for the special study of the globe, since it is sufficient to have it habitually within sight. This can generally best be done by keeping a small globe upon the writing-table. The

true form and positions will thus presently become familiar, and will correct the misshapen picture of the world-map which has become impressed upon the memory. One advantage of using a small globe is that true directions can be quickly ascertained by stretching round it an ordinary elastic-rubber band. It will also be found advantageous for strategic study to dismount the globe from its axis and keep it supported on some kind of cup, in order to avoid that restriction of view which results from the necessity for turning it on only one axis.

We all want to "think imperially," but the process is much hampered if we carry about as part of our mental equipment a distorted picture of the Empire, and I do not exaggerate in saying that it is an intellectual obligation upon every educated British subject to add the globe to those appliances for reference, such as the dictionary, almanac, railway time-table, and atlas, which he already regards as indispensable.

Turning now to the Mercator Map of the World, which, subject to correction by the globe, we must continue to use, we find that the form in which it is most frequently drawn happens, fortunately, to emphasise an important fact in the strategic geography of the British Empire. The aspect of strategic geography which requires and receives most study is that of communications; the Pacific Ocean is the great gap in our naval communications, and a Mercator Map divided, as is most often done, along the 180th meridian, *i.e.* the middle of the Pacific Ocean, is in accordance with the important fact that, from the standpoint of our naval stations and our present naval policy, the strategic ties of Australasia are with India and South Africa, not with British Columbia. There is an additional reason for this, viz., that, the lands on the Indian Ocean being occupied or dominated by us, it is only from the Pacific side that Australasia is open to attack. Thus from the strategic point of view we may regard the principal lands of the British Empire as grouped in the following manner, viz., the British Isles and Canada facing each other on opposite shores of the North Atlantic Ocean; South Africa, India, and Australasia at the three corners of the triangular Indian Ocean: and Egypt half-way between the Indian and Atlantic Oceans. This Protectorate is situated near the middle of the Great Maritime Defile of the world, which is known in its several parts as the Gulf of Aden, the Red Sea, Suez Canal, and the Mediterranean, the last being divided into an Eastern and Western basin at the Straits of Tunis, which Malta guards.

Of these lands, the British Isles, Canada, and Australasia are separated by sea from the territories of the Central Powers, and, in the present state of communications, South Africa also is not accessible by land to European or Asiatic armies. On the other hand, Egypt is conterminous with the Turkish dominions, and the Indian Empire is only separated therefrom by the length of Persia, or, to be accurate, by the half of it, since the sphere of influence of the Indian Government extends over Persian territory as far as the Straits of Ormuz.

Considered as recruiting bases for the Navy and Army, the lands of the British Empire fall into two categories, the first comprising those which are the racial home of European people, the second those peopled

by indigenous races of other stock. The first category comprises the United Kingdom and the Colonial Dominions (Canada, Australia, New Zealand, and South Africa), all of which, as I have pointed out, are accessible only by sea to European or Asiatic armies. The second category, the Native Dominions, are almost all situated on the mainland of the Old World, and the chief members, the Indian Empire and Egypt, with the Soudan, are, as I have said, respectively in contact with, and within possible reach of, the armies of the Central Powers. The situation of Egypt with reference to other British territories, and that of the Suez Canal with reference to the tracks of our sea commerce, are singularly central. On a Mercator Map of the World divided along the 180th meridian we have Canada in the upper left, and Australasia in the lower right corner. If now a great circle be drawn upon that map connecting Wellington, N.Z., with Halifax, N.S., we shall find that it passes somewhat south of Albany across the Indian Ocean to the Gulf of Aden, through Lower Egypt, and, passing across France, traverses the Atlantic very nearly by the shortest course from the English Channel to Halifax, N.S. It is not without interest also to note that the prolongation of this straight line passes along the coast of the United States to Florida and thence across that peninsula to the Gulf of Mexico. The straight line drawn through Wellington, N.Z., and Halifax, N.S., is therefore nearly coincident with one of the greatest lines of movement of the world's shipping, and lies centrally with reference to the naval and mercantile shipping tracks of the Empire. Egypt, as we have seen, lies on this line, and its position upon it is remarkably central. The table given in the Appendix shows that Port Said occupies a more central position in the British Empire, reckoning by steaming distance, than Bombay, Cape Town, Halifax, Melbourne, or Southampton. Thus Egypt, though not a recruiting base, is admirably situated as a central depôt or camp for the Imperial forces, and, as long as we control sea communications, it is also a central situation for the dispatch of expeditionary forces to attack or support Mediterranean positions. In addition, the country is singularly defensible against land attack, and on the only side accessible to the operations of considerable armies the Canal itself enables naval artillery to assist in the defence.

§ 3. Our Naval Communications.—As the territory of the British Empire is discontinuous, we have to guard, not only the routes to our armies in the field, but those by which they are assembled. Against this initial disadvantage may be set the fact that the wide distribution of our lands endows the Empire with such a variety of resources that it is capable of producing all the supplies which we need in war. It would therefore be possible for us to make the same lines of sea communication serve both for the recruitment and supply of our armies, thereby effecting an economy of naval force, as well as endowing the state with a control of bases of supply which is physically impossible to most of the Great Powers.

I proceed to examine the lines of naval communication used in the assembly of our forces. If troops were required for the Indian frontier when the Egyptian route was not available, the Canadian Contingent

might proceed by the shortest route from Vancouver to Singapore, which is almost a coasting voyage, by way of Japan and Hongkong. Except for this route we may regard the Pacific Ocean as a gap in our communications, and consider that the task of the Navy in assembling our forces consists in guarding the routes across the Indian Ocean, across the North Atlantic, and the two routes from the Atlantic to the Indian Ocean, those *via* Egypt and the Cape. At Aden we have a station assisting the Fleet to stop entry to the Indian Ocean by ships from the Red Sea ports of the Central Powers at the Strait or Defile of Bab-el-Mandeb. It may be convenient to refer to this kind of naval station as a Stop, a term familiar in the sport of shooting, and applicable to one of the two purposes for which defiles are held, viz. that of holding up traffic. We also have coastal and insular positions on and near the Straits of Ormuz, on the Persian Gulf, but these do not afford good naval facilities, a fact which increases the advantage of our occupation of the delta of the Tigris and Euphrates, a position of capital importance with reference to the security of our sea communications across the Indian Ocean, as well as to the defence of the Indian frontier by our land forces.[1]

It will be convenient to refer here to the proposed German naval base at or near the head of the Persian Gulf. This would not by itself give free access to the Indian Ocean on account of the narrowness of the Straits of Ormuz, the position to which our recognised sphere of influence in Persia extends. The present effort to raise the population of Persia against us, and to induce them to make common cause with the Mesopotamian forces of Turkey, throws light upon the German intention, probably entertained from the first, of obtaining control of the eastern shore of the Persian Gulf as the necessary accompaniment of a naval base at or near Koweit. In Egypt we have a Stop, preventing access to the Red Sea from the Mediterranean. The station which assists the Navy to secure communication from the Atlantic to the Suez Canal against the Austrian fleet is Malta, which is conveniently situated for superintending the stoppage of the Straits of Otranto, the bottle-neck of the Adriatic.

In the event of our losing Egypt, or even losing the use of the Suez Canal, communication between the Atlantic and Indian Oceans would be maintained *via* the Cape of Good Hope, a route along which we have many naval stations. It is at Gibraltar that we protect this route from menace by Austria (in the present war) and, generally, from any Mediterranean Fleet, against which its situation on the narrow Straits makes it an effective Stop. This is perhaps as important to our permanent communications as its function of guarding the Straits from stoppage on the route to the Canal.

The table of steaming distances at the end of the paper shows the relative centrality of Southampton, Halifax, Cape Town, Bombay, and

[1] We are so much accustomed to think of the burden entailed by the land defence of India that we are apt to forget the advantage for offensive action which its position bestows upon a naval power.

Melbourne, ports of embarkation of expeditionary forces in the five great divisions of the Empire, the United Kingdom, Canada, South Africa, India, and Australasia. It will be seen from the table that Cape Town is the most central of the five. The route from Southampton to Bombay is, however, about 4500 miles longer than that by Suez, which, for transports making fifteen knots, entails an additional thirteen days at sea. This would only be a vital matter if the change of route were necessitated by a surprise attack when India was simultaneously threatened.[1] Thus, having worked inwards from the outskirts of the Empire, I come to the positions on the English Channel and the North Sea which confer on our Fleet a geographical advantage over that of Germany in the contest for control of sea communications between the United Kingdom and Canada, the Cape, and Gibraltar, as well as with the country (France) where our largest expeditionary army has to be reinforced and supplied. The island of Great Britain restricts the entrances to the North Sea to a strait of about eighteen nautical miles between Kent and France, and a passage of about 250 nautical miles between Scotland and Norway. As long as these two passages are held, ships based on the harbours of Germany cannot interfere with the communications between any part of the Oversea Dominions and the southern or western ports of the British Isles. The development of certain appliances enables our Fleet, as I understand, to block the Straits of Dover pretty effectually against the passage of submarine vessels, but the northern opening to the North Sea is too wide. Access to the ports of our eastern coast is now secured, not by geographical advantage, but by a superior fleet, and by the remarkable development which our Navy has effected since the beginning of the war in the methods of dealing with submarines and mines.

But the holding of the shortest line between the North of Scotland (or the Orkneys) and Norway would not suffice for the commercial blockade of Germany, since there lies a long stretch of the Scandinavian coast to the north of it, and another patrol-line is held for commercial blockade. This runs from the Orkneys to the eastern extremity of Iceland, and thence beyond the Arctic circle to the fringe of the Polar ice off the Greenland coast. The whole distance is about 750 nautical miles. A point of capital importance with reference to the communications between the island of Great Britain and the Dominions remains to be mentioned, viz. the position of Ireland. That island stands to Great Britain as Great Britain does to Germany, viz. across the line of sea routes to all the oceans. The passage between Cape Clear, in Ireland, at the western entrance to St. George's Channel, and Ushant, off the coast of Brittany, at the western entrance of the English Channel, is the same width, about 250 nautical miles, as the passage between Scotland and Norway. A shorter line held from the Irish coast would block the entrance to the Bristol Channel, and a yet shorter line the southern

[1] The deflection of sea routes caused by the huge southward projection of Africa confers upon a fleet based on the Cape a dominating centrality at the pivot of movement. Moreover, the routes to the East being long, a port of call is required, and the opposite shore, that of the Antarctic Continent, affords no alternative harbour.

entrance to St. George's Channel. Again, the North Channel between Fair Head, in Antrim, and the Mull of Cantyre, in Argyll, is much narrower than the Straits of Dover, having a width of only eleven nautical miles, and if this line were held, it would block the northern entrance to all the important commercial ports of the western coast of Great Britain, for there are none in the Western Highlands of Scotland. There would remain the route round the North of Scotland, apparently open for the use of ports on the south and east coasts of Great Britain, but, since the trans-oceanic ports lie further south, the proper steaming tracks would pass close to the north coast of Ireland. The south-west and north coasts of Ireland are indented by long, sheltered, deep-water inlets, which afford magnificent shelter for fleets, though their advantage as harbours is apt to be forgotten by civilians, owing to the circumstance that most of them are distant from any manufacturing or trading centre, and have therefore no commercial use. The strategic importance of Ireland is not realised by the average citizen, because its foreign relations have long been merged in those of the neighbouring island. There are many other positions in the world besides Ireland, which, if ever the British Navy were defeated, would suddenly be seen to possess a strategic importance which the course of historical events has concealed from the casual observer.

§ 4. The Cologne Position and Belgium.—Germany is the main recruiting base of the Central Powers for both naval and military forces. Its main base of technical supplies for armies is situated in the district of which Cologne is the metropolis, and Essen the chief arsenal, and its naval base is the district of Hamburg and Kiel, where the North Sea and Baltic are connected by the Kiel Canal. The development of this region as the chief, and practically the sole naval centre is due to the circumstance that Germany does not possess the mouths of the Rhine (greatest of all the inland waterways of Europe, which traverses the centre of the Cologne district), or those of the Scheldt, which form, with the mouths of the Rhine, a single great water-gate to Europe.[1] If we take Cologne as the centre, and with a radius of 600 statute miles describe a circle, that circumference will be seen to comprise an area of human activity far more important than can be found of the same extent in any other part of the world. The number of cities of more than half a million inhabitants within the radius is twenty, including many of the largest in the world, and many of the greatest ports. Pittsburg, in the United States, and Hankau, in China, have only six or seven such cities within the same radius.

Western Europe, including the British Isles, is the hub of human activity, within which Great Britain and Germany are the two chief centres. But when we compare the condition of the regions which centre on London and Cologne respectively, we see that the latter needs for the full development of its commercial and military resources the

[1] I have not Mr. Mackinder's book on *The Rhine* beside me for reference, but I am conscious that my appreciation of the position of Cologne dates from my reading of that interesting work.

control of the Low Countries (Holland and Belgium). We who own the whole of the Thames have a difficulty in realising the potency of the forces which impel a nation to get control of the entrance to its own waterways. The control of the Low Countries is the most important feature in the preparation for the final attack of the Germans upon the British. Their occupation would give the two things wanted—viz., first, increased naval resources; second, improved naval positions. The key to the position is Belgium, as the following considerations show. It will be noticed that these considerations relate, as usual, chiefly to lines of communication. They are, first, that the occupation of Belgium cuts the communications between Holland and France; second, that Belgium itself is the necessary line of communication with the French departments of *Nord* and *Pas de Calais*, or the "Calais Corner," as I shall call it, the position on the continental side of the Straits of Dover. Now let us consider how the occupation of the Low Countries and the Calais Corner of France would affect the problem of the invasion of Britain from Germany. For the purpose of raids, any point on our coast may be chosen (a circumstance which throws a great burden on our land forces), but when invasion is attempted the hostile forces are based on one or more fixed points at which supplies have to be landed. Strategically, the problem of invasion then becomes mainly that of securing the sea communication between the hostile ports and the landing place. Now the general distance from the German North Sea bases to our east coast ports is about 300 nautical miles; from the mouths of the Rhine and Scheldt about 100; and from the Calais Corner about 20; so that it is obvious that the mere reduction of distance would increase several-fold the difficulty of our task of interrupting communication, when and if the German fleet grows to such dimensions that it can contend with ours. But the advantage to the enemy of positions on the English and what I may call the Dutch Channel is not confined to that of a shorter crossing, for they would be on the flank of our line of naval communication between the English Channel and the North Sea, as well as threatening our line of military communication across the English Channel.

It used to be thought that the presence of an allied French and English army in the north of France would be the best military defence against naval invasion based on Belgium, since this army would menace the German line of land communication. The development of defence by trench fortification has, however, falsified this anticipation as far as the present war is concerned. It will be seen, therefore, that Belgium is the key to the German plan of attack on Great Britain. Neither must it be forgotten that as Belgium, entered by Liége, provides diverging roads to Paris and to Calais respectively, so the routes to Cologne from both London and Paris lead convergently through Belgium. Before leaving the consideration of the Low Countries, reference must be made to their importance with respect to aerial attack, a form of warfare which may be expected to be of much greater importance in the next war. The eastern frontier of the Low Countries, along the German border, runs parallel to the shores of Norfolk, Suffolk, Essex, and East

Kent at the distance of about 200 statute miles, of which the width of the Low Countries is about one-half. Thus, if the Low Countries were permanently occupied the German aerial attack could be delivered from half range.

§ 5. The Balkan Peninsula.—We must consider the Balkan Peninsula in two aspects, of which the first is of importance at the present moment, and the second of great and permanent importance. The first (*a*) is as the line of communication between Turkey and the German arsenals which are her technical base: the second (*b*) is as the line of communication between Germany and the Constantinople position, from which she intends to dominate the Near and Middle East, including Egypt and India.

§ 5. (*a*) The Line of Communication between Turkey and the German Arsenals.—The Turkish Empire is self-supporting in the matter of food, but the principal bases of its technical supplies are in Germany. Thus, unless some route from Germany can be kept open for transit of munitions, the fighting strength of Turkey must rapidly diminish after the stock, or "reserve," of munitions is used up. This is also the case with the German colonies, but Turkey has the advantage over these that she has land as well as sea connection with Germany. Since the changes in the political map of the Balkan Peninsula which resulted from the Balkan War of 1912-13, all westward routes from Turkey in Europe pass through Bulgaria. Bulgaria has thus become a corridor-country, that is a political, as distinguished from a physical, defile, leading to the Constantinople position. Bulgaria, having at length decided to join forces with Germany, there remained only a short stretch of country across which it was necessary to restore communication, which might be done either through Rumania or Serbia. The latter country provides the better route, the main railway to Constantinople, and being already an enemy the attack did not bring in additional hostile forces, as pressure upon Rumania might have done. There are only two lines along which the mountainous peninsula of the Balkans can be crossed at low elevation and with easy gradients. These are the line of the lower Morava, Nishava and Maritza rivers, from near Belgrade, *viâ* Nish, Sofia and Adrianople to Constantinople: and that *viâ* the Morava and Vardar, diverging from the above route at Nish and leading to Salonika. Both routes are provided with a railway, in a land where railways are few and where the character of the ground makes it impossible to do much in the way of building them quickly. The line from Nish to Salonika was the only route capable of carrying heavy traffic which connected Serbia with the Allies, on whom she was dependent for reinforcement and munitionment. The western frontier of Bulgaria lies parallel to, and at only a few miles' distance from, this railway line, and the valleys of several rivers tributary to the Morava and Vardar descend to it from the Bulgarian heights. Thus the Bulgarians occupied positions dominating the vital line of communication connecting Serbia with her base of external supply, and, by seizing points on the line, they compelled the Serbian army, which was retreating before the German advance, to fall back, not on the new base which its

Allies had established for it at Salonika, but into the wilderness of Albania. Apart from the Macedonian territory acquired by Serbia in 1913, that country, as defined in 1878 by the Treaty of Berlin, is sufficient in extent and suitable in frontier for the defence of the railway which leads from Belgrade to Sofia. Indeed, the line of high ground running from north-west to south-east, which formed the frontier between Serbia and Turkey (trenched by the Morava, near Vrania), seems perfectly adapted for the purpose. In the territory of Bulgaria itself, the Constantinople railway is guarded by the lofty ranges of the Balkans on the north, and the Rhodope Mountains on the south. From the west the mountains of Montenegro and Albania, having no railways and no good roads, do not permit of heavy traffic, and hence prevent any strong military pressure. Our direct attempt on Constantinople not having succeeded, it is evident that the Turkish line of communication with the arsenals of Germany is for the time being secure against all the Powers at present participating on the side of the *Entente*, and that she is therefore in a better position to renew her attack on Egypt, the only part of the British Empire which adjoins her territory, as well as to undertake a counter-offensive against our invading forces in Mesopotamia.

§ 5. (*b*) The Constantinople Position.—The strategic importance of the Balkan Peninsula with reference to the British Empire is due to the fact that it is the land-link between Central Europe and the commanding Constantinople position, where, in a situation singularly defensible from sea attack, is a naval station of enormous potentialities, as well as the one land route (except that through Russia) which leads from Central Europe to Asia, and thence to Africa, a route which is also easily defensible at the defile. How truly the Constantinople position may be described as a land defile is evident when we consider that the two river-like crossings of the Bosphorus and Dardanelles occur in the middle of a water-gap which is 1000 statute miles across, reckoning from El Arish, on the Peninsula of Sinai, to Rostow, on the north shore of the Sea of Azof. It is necessary to think of the permanent strategic relationship of the Balkan Peninsula to the British Empire apart from the present phase of the war. In order to clear our ideas on this important matter, let us see what would be the position of our Native Dominions on the mainland of the Old World if the Germans remained after the war in the position they now occupy, viz., with good and sheltered communication with Constantinople, and having the Turks, reorganised and reinvigorated, as Allies. The possession of the continuous territory, Germany, Austria, Serbia, Bulgaria, Turkey-in-Europe, and Turkey-in-Asia, would enable the Germans to take full advantage of the strategic capabilities of the Constantinople position. That position is one of the most remarkable in the world, but, except in the days of Constantine and his immediate successors, and during the time of Ottoman greatness, while Turkey was still a sea power, its strategic potentialities have never been developed. With Constantinople as the middle point in the territory of the Central Powers, its combined naval and military advantages could be utilised beyond previous

experience. The task of defending Egypt would be rendered much more difficult, if the Central Powers had a well-equipped naval base on the Sea of Marmora to assist the attack of their armies. These could also advance across Persia to Kabul and Quetta, *i.e.* to the same gateways of India which can be approached by the northern routes which start from Moscow, whilst a third line of invasion, the southern route to Karachi, would be more readily open. It is interesting to notice in this connection the coincidence that Quetta is almost exactly the same distance from Constantinople as from Moscow, the direct distance, expressed in round figures suitable for remembrance, being 2000 statute miles. Although the strategic possibilities of the Constantinople position are enormous, the constraints upon their development are numerous and complex, and only in connection with Central Europe, and as planned by the Germans, can they be fully realised. To Russia its use would be purely naval, and for her it is not the route to Turkey-in-Asia. In view of our recent campaign in this part of the world, it may be well to draw attention to the conditions under which the Constantinople position could be held from overseas. This strategic "position" includes the Sea of Marmora and its exits, the Bosphorus and Dardanelles. Two land frontiers would have to be defended instead of the one which the Turks have to keep, the length of which, measured directly from sea to sea and not reckoning the windings which are really a necessary feature of frontiers, are respectively 100 miles on the European and 200 on the Asiatic side. It would be a heavy commitment. The task of occupying Anatolia, and thus blocking the advance of armies from Central Europe, would be a vast undertaking on account of the size of the country and the bad communications; and, all things considered, it appears that it is in the Balkan Peninsula itself that the German-Turkish combination must be severed.

§ 6. On the Question of Providing a "Kiel Canal" for Britain.—The aspect of strategic geography which most nearly concerns the safety of the British Empire is that of naval bases and lines of sea communication. The lowness and narrowness of the land between the Forth and Clyde appear to make it mechanically possible to effect a great improvement in present conditions in this respect. The waters from the Firth of Forth to the Orkneys are the commanding and central position of the Fleet which controls the German coast and the entrance to the Atlantic. The stations which squadrons take up for the performance of their duties are often described as bases, but there is another class of naval station to which the term more logically applies, *i.e.* the place where ships-of-war are built and repaired. The ideal situation for such a base is one protected by nature from attack, and at the same time accessible by a short line of communication, also sheltered, from the service-stations of the active Fleet. The Clyde sea-area is better situated in respect of natural protection from a sea attack based on continental harbours than any other shipbuilding centre in Great Britain, but the line of naval communication with the east coast of Scotland is singularly bad. The distance even by the northern route is considerable, and the west coast of the Highlands,

with its deep indentations and numerous off-lying islands, is, moreover, an almost perfect lair for hostile submarines.

With a battleship canal from Forth to Clyde we should possess on the west coast a base for the building and repair of ships of war which, in its combination of local resources, accommodation, natural protection, and accessibility to damaged ships, would be equal or superior to any that the world possesses, and far superior to any that we now have. Further, the canal would provide the active-service stations on the east coast of Scotland with short and protected access to other important shipbuilding centres besides the Clyde, *e.g.* Belfast and Barrow. Lastly, it would increase the centrality of the east coast stations for the purpose of operations, giving a shorter and safer route for the transfer of fighting ships from the gap between the north of Scotland and the Continent to that between the Continent and the south of Ireland.

The experience of the present war, and the indications which it affords of future developments, make it advisable to re-open the consideration of this scheme. In deciding whether the cost of providing this protected access to a sheltered base be prohibitive or not, account should be taken of the *Military* saving, not merely on the cost of the defences at an exposed base, but by setting troops free from garrison duties. *Per contra* the engineering problem needs further consideration in the light of the experience which has been gained at Panama on the subject of landslides in deep cuttings.

Appendix.

Table showing relative Centrality of Embarkation Ports and of Port Said. The Ports are selected, as representing the five Chief Recruiting Bases of the Empire, viz., the United Kingdom, Canada, South Africa, Australasia, and India.

The figures represent the steaming distance between ports, in Nautical miles. (1 *Nautical mile* = 1·15 *Statute miles.*)

Port Said to Bombay	3,047 miles
„ „ „ Cape Town	5,346 „
„ „ „ Halifax, N.S.	4,571 „
„ „ „ Melbourne	7,842 „
„ „ „ Southampton	3,043 „

Average distance of Port Said from ports of Embarkation, 4,770 miles.

Cape Town to Bombay	4,604 miles
„ „ „ Halifax, N.S.	6,423 „
„ „ „ Melbourne	5,814 „
„ „ „ Southampton	5,947 „

Average distance of Cape Town from other ports of Embarkation, 5,697 miles.

Bombay to Cape Town	4,604 miles
„ „ Halifax, N.S.	7,618 „
„ „ Melbourne	5,535 „
„ „ Southampton	6,090 „

Average distance of Bombay from other ports of Embarkation, 5,962 miles.

North Shore of Lake Superior, near Coldwell, Peninsula Bay.

This sketch illustrates the scenery at the southern edge of the "Canadian Shield." The rounded ice-worn hummocks and ridges of hard metamorphic rock, almost bare of soil, are covered more or less thickly with mixed forest.

Southampton to Bombay	. . . . .	6,090 miles
„ „ Cape Town	. . . . .	5,947 „
„ „ Halifax, N.S.	. . . . .	2,540 „
„ „ Melbourne	. . . . .	10,885 „

Average distance of Southampton from other ports of Embarkation, 6,365 miles.

Halifax, N.S., to Bombay	. . . . .	7,618 miles
„ „ „ Cape Town	. . . . .	6,423 „
„ „ „ Melbourne,	. . . . .	12,413 „
„ „ „ Southampton	. . . . .	2,540 „

Average distance of Halifax, N.S., from other ports of Embarkation, 7,248 miles.

Melbourne to Bombay	. . . . .	5,535 miles
„ „ Cape Town	. . . . .	5,814 „
„ „ Halifax, N.S.	. . . . .	12,413 „
„ „ Southampton	. . . . .	10,885 „

Average distance of Melbourne from other ports of Embarkation, 8,662 miles.

THE RESOURCES OF CANADA.[1]

By H. M. Cadell, B.Sc., F.R.S.E., D.L.

(With Illustrations.)

3. Mineral Resources.

Coal.

The coalfields of the Dominion belong to two widely separated geological periods. The Carboniferous system, which includes the great British and American coalfields of the eastern States, is only coal bearing in a small part of the Maritime Provinces in the extreme east of Canada, and it is a curious fact that although rocks of Carboniferous age are extensively developed in the far west and among the Rocky Mountains, they are quite devoid of coal seams throughout that wide region.

Western Coalfields.—The important coalfields in Alberta and the Western area belong to a much younger geological period. They include a variety of qualities of coal, from lignite or brown coal to black anthracite, or coal that has been metamorphosed by heat and pressure, and contains a high percentage of carbon but very little hydrocarbon or tarry and volatile matter.

Prairie Coalfields.—The great prairies composed of flat strata of Tertiary and Cretaceous age, contain in Saskatchewan and Alberta numerous beds of lignite and semi-bituminous coal. The Tertiary lignites can be seen cropping out on the sides of stream channels, and the seams reach at places a thickness of 18 feet, but from the fuel point of view they are not of great calorific value, as they contain from 18 to 24 per cent. of moisture and from 10 to 16 per cent. of ash, and crumble down on exposure to the air. These inferior Tertiary coal seams occur in a formation extending over nearly 12,000 square miles in Saskatchewan

[1] Continued from p. 130.

and 2500 square miles in Alberta. Mr. D. B. Dowling of the Canadian Geological Survey has reported at length on the Canadian Coal Resources in vol. ii. of *The Coal Resources of the World*.[1]

He gives the actual reserve of Tertiary lignite in Saskatchewan at 2,412,000,000 metric tons from an area of 288 square miles, but the probable reserves are stated to be about eight times this quantity (p. 473). In fact, great areas have not been bored at all, and the coal reserves are not yet calculable with any degree of certainty.

The Cretaceous coal, mainly occurring in Alberta and British Columbia, is of far greater importance than any other kind. The actual reserves in Alberta extend over more than 25,000 square miles, and the probable reserves over 56,000 square miles. Of the former 20,000,000 tons had been mined up till 1911, and there was estimated to remain 386,372,800,000 metric tons. This apparently inexhaustible quantity includes seams of 1 foot thick and over, to a depth of 4000 feet. But it must be remembered that for all practicable intents and purposes seams of coal less than two feet thick are unworkable in Canada, and it would never pay to mine coal at a greater depth than 2000 feet. Even at that great depth the coal must needs be of high commercial value to meet the enormous cost of mining it and leave a sufficient margin of profit for the shareholders.

Mining Difficulties.—It is, however, certain that the Alberta and British Columbia coalfields are of vast extent and importance to the Dominion. But it does not by any means follow that coal mining can be profitably carried on merely because there is abundance of the commodity. If coal is very plentiful at any place, it will be correspondingly cheap, and competition between mine-owners for the market, though highly advantageous to the public, will not be of much advantage to the producer. Coal is not like gold, with a fixed standard value, and its cost depends on many conditions, including the supply of timber and the state of labour. Coal miners are notoriously a difficult class of the community to deal with, and in Western Canada labour troubles in collieries are as common as they are in the United Kingdom. At the time of my visit, in 1913, a great strike, accompanied with much disturbance, had been going on for several months in the important coalfield of Nanaimo on Vancouver Island. Coal had locally risen to famine prices, and the Canadian industry had become completely paralysed, to the great advantage of the adjacent American collieries across the boundary, where the trades union that was apparently responsible for the trouble had its headquarters. Canada is not in every respect the better of being so near the great Republic.

No doubt the coal resources will be steadily developed in Western Canada in spite of these difficulties, but the supply of coal easily worked and accessible to the market is not inexhaustible, and unlike forests or fisheries, or even peat mosses, coal and other minerals when once worked and gone, are gone never to return or be replaced.

[1] This monumental work was published in 1913 by Morang and Co., Toronto, under the auspices of the Twelfth International Geological Congress, which met in Canada in 1913.

Waste in Coal Mining.—It is thus most important from the national point of view to attend to its conservation also, and to work the coal without wasting it. Many of the seams in Alberta are very thick—some are over 50 or even 100 feet—and the working of thick seams is generally a very wasteful process. A good seam 6 feet thick, if at any depth from the surface, can often be more advantageously mined than one, at an equal depth, 12 feet or 20 feet in thickness. If the seam is thick, large pillars of coal must be left in to support the roof, and the pillar coal thus lost is stated by Professor Adams (p. 58 of *Conservation Commission Report*) to be on the average no less than 50 per cent. of all the original coal. In the old Nova Scotia coalfield, the amount of coal that has been wasted is as great as that which has been worked, and in the newer coalfields of Western Canada the same process is being repeated. Millions of buffaloes were killed in the past for the sake of their tongues only, and the country has lost a valuable source of hides and meat that may well be regretted now. Future and impoverished generations may in the same way, perhaps, arise to lament the prodigal waste of their predecessors among the priceless coalfields of the Empire.

Seams of coal up to 8 feet in thickness can, in some cases, be advantageously worked on what is known to the mining engineers as the Longwall system. By this method the whole seam is very cheaply and easily removed without wasting any coal at all, and the superincumbent rock, with the surface of the ground above it, is allowed to sink down uniformly and safely to a depth nearly corresponding with the thickness of the seam. This system has several other important advantages, especially in fiery mines, but it requires a considerable quantity of timber, and in places such as the prairies, at a distance from forests, the cost of wood may be prohibitive. But the timber does not need to be very heavy, and in prospective mining areas it might be of public advantage for the government to plant pine forests now which, under ordinary circumstances, might in twenty or thirty years' time produce a crop that could be sold with profit for local pitwood. The Longwall system cannot, however, well be used for mining thick seams, but before it was first generally introduced, some sixty or seventy years ago, all coal was worked in Great Britain on the very wasteful pillar system that had been in vogue for centuries.

Nova Scotian Coalfields.—Nova Scotia is the only province in which the true Carboniferous fuel has been found in Canada, and the extent of coal-bearing land is small in comparison with the immense coalfields of the west. The principal collieries are at Sydney, on the NE. coast of Cape Breton Island, but there are smaller fields at New Glasgow in Pictou county, and at Joggins and Springhill in Cumberland county, at the head of the Bay of Fundy. The Cape Breton fields were first opened in 1720, but not until 1820 was much mining carried on. They are still producing large quantities of good bituminous coal, and in 1912 the output of Nova Scotia coal was nearly 8,000,000 tons—more than half of the whole Canadian output.

Sydney Coalfield.—The Sydney seams crop out near the shore, and dip at gentle angles under the sea. The coalfield is thus mainly sub-

marine, and the farther out the workings extend under the Atlantic, the deeper do they become. They have been carried at places more than a mile out from the shore, and since the inclination of the strata though small is regular, and the rocks undisturbed by dislocations, the limit of the field is determined by the distance it may be found practicable to extend operations outwards from the shafts on the shore.

There are nine seams of more or less workable coal in the Sydney field, some of them nearly 10 feet thick, and several of the outcrops can be seen on the face of the sandstone cliffs round the coast. The principal collieries are now in the hands of the Dominion Coal Company, which was organised in 1903 by a special Act of the Legislature of Nova Scotia with a capital of $18,000,000. This great industrial organisation opened up a new era of mining in the province. In the first year of its operation (1893) the output was 834,019 tons, but after twenty years' developments the production in 1912 had risen to 4,332,320 tons. One of the collieries, with two shafts, raises from 4000 to 4500 tons in eight and a half hours, and employs one thousand men underground. The quantity of coal that can be produced from this field is great, but with this increased output the supply still in reserve is being diminished at a correspondingly increased rate The coal is nearly all worked on the pillar system, and thus much of it is lost. The question of removing the pillars has been considered, but at one colliery the result of a trial proved disastrous. The taking out of some pillars, resulting in the sudden letting down of the roof, also let in the ocean, although the working was several hundreds of feet under the sea bed, and the colliery was permanently drowned out.

Submarine Coal Mining.—But coal can be worked quite safely under the sea on the Longwall system, and the whole of the seam extracted, *provided there be a thick enough covering of impervious mud or clay* between the rock-surface and the sea-bed. The writer has for many years been engaged in working coal seams up to 6 feet in thickness on this system at from 300 to 500 feet under the Firth of Forth, where there is a thick clay bottom, and the sea has never burst through or given any trouble. In fact, these submarine workings are drier than many under the dry land.

It is therefore a matter of importance to ascertain the nature and thickness of the mud or detritus covering the rock under the sea bed at Sydney. This, however, can only be done by boring, and if the water is deep boring to any depth in the ocean bed is a very difficult, if not impossible, operation for the engineer. But it is natural to suppose that there is here, as elsewhere, a certain quantity of mud or clay produced by the erosion of the land, spread over the rock surface beneath the waves in a thicker or thinner bed. The advantage and economy of working out the thinner seams at least by the Longwall system is so great, that an experiment, even if it failed, would be worth attempting. My own predecessors wasted and lost much good coal, and until I first cautiously experimented on it more than twenty years ago, nobody considered it possible by the Longwall system to work a 6 foot seam safely and profitably, especially under the sea. The success in this case

was such that the pillar system has been entirely abandoned, and the whole of the coal is now economically won with coal-cutting machines. These valuable contrivances both save the miners the most laborious part of their work, the so-called "holing" of the seam, and also produce the maximum quantity of large coal, which is generally considered of greater value than the small coal or dross.

Oil Shale.—Canada is not a great producer of petroleum, but a considerable oil-field exists in south-western Ontario, and small quantities have been found in New Brunswick and under some parts of the prairies.

In New Brunswick, on the Petitcodiac River, at the abandoned Albert mines near Hillsborough, oil shale occurs in the Carboniferous formation under the Millstone Grit. I am well acquainted with the Scottish oil shales, and the shale I have seen in that part of New Brunswick is of the same nature: indeed, there is one bed with abundant fossil fish remains, including *Rhadinichthys*, one of the common genera of the well-known Lothian shales at Pumpherston. Between thick seams of laminated or "paper shale," not very rich in oil, there is a seam of so-called Albert shale about 3 feet thick, a kind of Boghead mineral, apparently of very high quality.

But oil shale to be workable at a profit, besides being good must be very abundant and accessible, and even then it is always seriously handicapped in the race with the native petroleum that comes up ready made. Oil shale, unless of very high value, requires also to contain enough nitrogen to give ammonia as an additional product of distillation. It is well to know of the existence of these beds of shale in New Brunswick, but the time to mine them has scarcely arrived. The geological structure of the Albert shale-field is obscure, and although the area has been bored at several places the extent of workable shale has not been well ascertained. After the American oil fields are exhausted and petroleum rises in value, the distillation of oil shale on the Scottish system may become a profitable industry in New Brunswick. Meanwhile the shale seams will not deteriorate with the keeping, and must be considered a valuable asset, but one that cannot be realised for several years to come.

Natural Gas.—Although natural gas is not a mineral in the strict sense, it is a hydrocarbon related to coal and oil, and of enormous importance as an easily transmissible source of energy. In Canada natural gas occurs in large quantities in the territory bordering on the east and north shores of Lake Erie in the province of Ontario. There are more than 1100 wells, from which the gas is piped to all the larger towns in the southern peninsula. One well in Essex county yielded for a short time 10,000,000 cubic feet per day from a depth of 1020 feet.

Gas has also been found in New Brunswick, and the town of Moncton is partly supplied from the local wells. It likewise occurs in Alberta, and there is an extensive gas-bearing stratum at Medicine Hat, at a depth of 1000 feet, from which that rising city derives much advantage. Calgary is also supplied with gas from Bow Island, 70 miles distant. The gas in the western area is from the widely dis-

tributed Lower Cretaceous formation, and the possibilities of further developing the production are considerable.

Waste in Gas Fields.—But it has been thoroughly established that all gas wells are exhaustible in time—they are reservoirs, not manufactories —and the supply, though great at any place, is strictly limited. Many once famous gas fields in the United States have now ceased to produce, and their demise has been hastened by the prodigious waste that took place during their lifetime. In northern Indiana the pressure of the gas dropped from 400 lbs. per square inch in 1886 to 50 lbs. in 1902, so that the vast reservoir was practically exhausted in fifteen years, and it is stated that three times as much gas was wasted as was used.[1] Dr. I. C. White, one of the leading petroleum authorities in America, at the great conference on Conservation held in Washington in 1908, said, "The blazing zone of destruction extends in a broad band from the lakes to the Gulf and westward to the Pacific, embracing in its flaming pathway the most precious fuel possessions of a continent. No one can even approximate the extent of this waste. From personal knowledge of the conditions which exist in every oil and gas field, I am sure the quantity will amount to not less than 1,000,000,000 cubic feet daily, and it may be much more. The heating value of 1,000,000,000 cubic feet of natural gas is roughly equivalent to that of 1,000,000 bushels of coal. What an appalling record to transmit to posterity!"

Mr. M'Dowell states that the daily waste of gas in Oklahoma, one of the newer fields, is equivalent to the destruction of at least 10,000 tons of coal daily, and that 80 per cent. of this loss is preventible. The Director of the United States Bureau of Mines estimates that the aggregate waste in the United States at the present time exceeds $50,000,000 or £10,000,000 per annum, of which 80 per cent. might easily be saved. The United States Government has, after the steed or most of him has been stolen, proceeded to lock the stable door, and the process of needless waste has now been checked by legislation.

An example to avoid.—With these facts and figures before Canada a flaming beacon has been erected to show the rocks that lie ahead and how they can be avoided. There has already been a considerable waste of natural gas, of which Canada has far less than the United States, and needs far more.

The recommendation of the Commissioners for legislation ensuring that all gas wells not being used must be securely plugged is one of great importance. The horse has not yet been stolen, and even if he is only a pony the sooner the stable door is securely locked the better for the future prosperity of his owners.

Nickel.

The one mineral of which Canada has a greater supply than any other country is nickel ore, and this is found almost entirely at one place in Ontario, among the old metamorphic rocks. The great nickel-

[1] *Conservation Report*, p. 65.

bearing ore body occurs on the line of the Canadian Pacific Railway, immediately north of the town of Sudbury, and it was almost accidentally discovered when the railway was being pushed through that rugged and apparently useless district in 1884.

The ore occurs in an eruptive mass of Precambrian granitic rock geologically known as norite, which crops out round the edge of a tract of country resembling on the map a huge boat with the bow pointing to the south-west. It is 36 miles long and 17 miles in breadth, and the belt of norite round the edge averages a mile and a quarter in width. The ore body dips down towards the centre of the trough, and has been mined or proved by diamond boring to reach a depth of more than 1000 feet, and indeed further exploration may greatly add to this

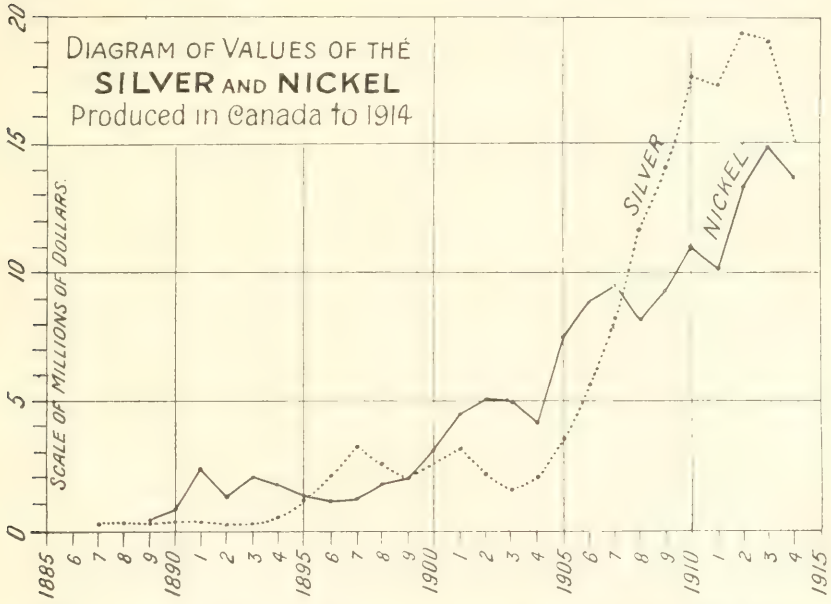


figure. The ore, mainly a sulphide of nickel and copper, was mined at first by opencast quarries and vertical shafts. The latter are grim crater-like holes, perhaps 6-700 feet deep, with gaping mouths of immense size, and levels opening off at varying depths. The production was irregular for many years, but has increased greatly since 1907 (see diagram). Up till 1912 5,500,000 tons of ore had been smelted. In that year the production of nickel was 22,421 tons, worth about $2\frac{3}{4}$ millions sterling, besides over 11,000 tons of copper. Professor A. P. Coleman, Ph.D., of Toronto, who has devoted much time to the geology of Sudbury district, wrote a valuable monograph on the Canadian Nickel Industry for the Canada Department of Mines in 1913, and he says, at p. 107, that "it is not unreasonable to assume that there are 100,000,000 tons of sulphides, workable and unworkable, along the whole range, which amounts to about 2,500,000 tons per mile."

There are several mining and smelting companies at work, of which the Canadian Copper Company is the most important and the oldest. It began operations in 1886 and has been working uninterruptedly ever since. The other considerable producer is the Mond Nickel Company, a smaller concern founded in 1900, which is in English hands. The ore is roasted and smelted on the spot and converted into matte, mainly a mixture of iron, nickel, and copper, which requires further refinement before the metals are finally separated and reduced to a commercial condition. None of the nickel-copper matte has yet been refined in Canada; but it was announced, in February 1916, that at the request of the Canadian Government, the International Nickel Company had decided to erect plant in Canada to refine the nickel. As Canada is stated now to produce 85 per cent. of the world's supply, and the ore reserves of Sudbury are enormous, this is manifestly a move in the right direction, a perfectly safe development where there can be no competition. The matte produced by the Canadian Copper Company is sent to New Jersey, and that of the Mond Company is shipped to Swansea in Wales.

The nickel and copper ore is pyritous in character and consists of various sulphides containing copper, nickel, iron, sulphur, and silica in varying proportions, with smaller quantities of several other valuable metals, such as arsenic, cobalt, silver, platinum, and gold.

Waste of Sulphur.—The sulphur which has to be separated forms from 20 to 40 per cent. of some of the sulphides, and its elimination by roasting in the open air is the first part of the smelter's work. The quantity of sulphurous acid discharged into the air is prodigious. Hundreds of tons of sulphur must thus be got rid of every day, and vast clouds of semi-asphyxiating but not unwholesome gas are discharged into the air. The sulphurous acid being soluble in water is carried by the rain into the thin soil, and all vegetation is destroyed for miles round the smelting works. The soil being thus deprived of its protective covering of vegetation is quickly washed off the bare gneiss and granite hummocks, and the country is brought back to the state of bleak and dreary desert in which it was left after the glacial period.

Recovery of Sulphur.—The question of the recovery of sulphur and its conversion into sulphuric acid or some other useful product has been often discussed, and is referred to in the Commissioners' report (p. 46). There is here not only room but need for inventiveness on a large scale. Sulphur can easily enough be extracted from pyrites, and there is no other means of producing it in Canada. It has been estimated that the cost of thus producing crude sulphur would be about £1 per ton, and the refined article about £1, 16s., and as the price of imported sulphur is £4 per ton, it is evident there is room for profitable enterprise here. But the practical difficulty arises from the very circumstance of its abundance. Such an enormous quantity might be produced that the price might fall so as to make the industry unremunerative, and the value of the product would not pay for the cost of its recovery.

Sulphate of Ammonia.—In this connection, however, as has been already noted there is an unlimited demand for sulphate of ammonia for

agriculture, and this will increase rather than diminish as settlement extends and farming methods improve. Sulphate of ammonia needs a supply of both ammonia and sulphuric acid, and it has been pointed out in a previous page how a supply of ammonia can be obtained from some of the peat bogs in Canada. But a far larger supply can be obtained as a by-product in the manufacture of coke in certain coal-fields, where the waste gases and tar are recovered and utilised. Both the sulphur vapours and the coal smoke that pollute the air and damage plant life, animal life, scenery and soil, can thus be brought together and married, so to speak, and instead of being any longer wasters and cumberers of the ground, they can become the parents of a highly useful offspring that will spread fertility and wealth over all the soil of the Dominion. Canada might in this direction become independent of the outside market, and in a position to provide for her own requirements, by the scientific utilisation of her own waste products.

There was a time, not a generation ago, when the ammonia water in the Scottish shale oil works was regarded as a nuisance, and run off to pollute the rivers, and when tar was got rid of by pouring it into disused coal pits. But now the ammonia and tar are about as valuable as the oil that was once only sought after, and indeed it may be said that some Scottish oil shale seams are now more valuable on account of the ammonia than of the oil for which alone they were originally sought after.

The barren rocks of the great Canadian Shield are known to be highly mineralised in many places, and they contain copper, silver, gold, cobalt, platinum, iron, and other metals, in the limited areas that have been prospected round Sudbury, Cobalt, Porcupine, and other townships. The extension of the railway was the means of discovering the hidden wealth of Sudbury, and, as exploration is pushed further north, no doubt new bodies of ore will be revealed, but these cannot be developed until the settlement of the country extends, and new means of communication and transport are opened up. Coal, copper, and gold have been found as far north as the Yukon, but the distance from the market is so great, and the cost of transport so high, that only the most valuable products of such remote territories can as yet be worked to advantage. But they can wait quite well, and their mineral value will not deteriorate.

Gold and Silver.—Silver has been found in large quantities in northern Ontario, in the Cobalt district. It is also mined in British Columbia in association with lead in the Kootenay and Slocan districts, where veins of argentiferous galena occur along with native silver, gold, and copper.

Gold has been mined in Nova Scotia, Ontario, and in British Columbia, chiefly at Rossland, where it occurs in reefs along with copper. The Porcupine goldfield is situated in Northern Ontario, 450 miles north of Toronto, and 120 miles north of the Cobalt silver district. It was opened up in 1909, and in 1910 the usual gold rush set in. The first mill was started in July 1912, and the gold production for that year was about £340,000. In 1914 this had risen to

£1,100,000, mainly from two mines, and in 1915 new discoveries were reported on the transcontinental railway 297 miles west of Cochrane.

The only part of Canada where alluvial or placer gold has been found in large quantities is at Klondike, near Dawson City, far north in the Yukon territory. This is geologically a singular fact. The explanation is, that the immense glacier or ice sheet that during the glacial period overspread the whole of eastern and most of northern Canada and British Columbia, as the ice covers Greenland to-day—this vast ice-cap was never formed over the far northern Klondike area at all. The climate, although cold, was apparently too dry to produce snow and ice. The old alluvial deposits in the glens, containing the gold that was originally washed in grains from the small veins in the hills, was thus spared by the vast besom of destruction that swept every particle of crumbled soil and every grain of heavy metal from off the face of nearly all the rest of Canada.

The Klondike gravels have been exhausted of their richest treasures, but a steady output of gold is still being obtained by dredging the poorer gravels with elaborate plant in the hands of skilled capitalists, and by washing the higher gravels with hydraulic monitors and flumes. The value of the gold produced in that field is now something over £1,000,000 yearly.

The value of all the gold produced in Canada was about equal to that of the silver produced in 1914. In each case this was a little over £3,000,000.

Iron.

The iron industry of Canada is confined to Ontario and the eastern provinces, and the native reserves of iron ore that have been discovered are not very important. The Sydney coal is mainly used in the furnaces of the Dominion Iron and Steel Coy. at North Sydney, Cape Breton, and good limestone needed for fluxing the ore is worked in that district. But the raw material is imported from Bell Island, Newfoundland, where there is a large deposit of easily mined iron ore, but no coal to smelt it. The Nova Scotia Steel and Coal Company have also extensive iron and steel works in that locality, and the two plants have a daily capacity of 1700 tons.

Bodies of magnetic, hematite and limonite iron ore have been found in workable quantity at a few places among the older rocks. The largest of these is on Moose Mountain in Ontario, 20 miles N. of Sudbury, where the output from the Helen mine is nearly 1000 tons per day. The ore is smelted at Hamilton or in the United States, but all the iron that is produced in Canada is not much over a million tons yearly, less than half the quantity required for the needs of the Dominion. No doubt iron, which is the most abundant and widely distributed of useful metals, can be also produced from deposits of limonite or bog ironstone found in the lakes and swamps of Canada, Sweden, and other countries. Unlike other mineral deposits this is precipitated from water and grows regularly in such wet places, and successive crops can be reaped at intervals

of years, but the collecting of bog ironstone is a primitive industry in which the output is small, and although it was profitable once upon a time when wood charcoal was used for fuel and iron was scarce and dear, it is not adapted to the elaborate requirements of the present day. The Canadian ironstone, unfortunately, all occurs so far away from the needful coal and limestone to smelt it that only the largest and most economically workable ore bodies can be opened up successfully.

4. Hydrodynamical Resources.

All mines however deep will be worked out in time, and many once famous mines are now silent and deserted all over the world. The increased mineral output from year to year is often made a subject of self-satisfied congratulation, but philosophers who look ahead to the future of the race see no great cause of rejoicing at the accelerating depletion of the buried treasure-houses of nature that can never be replenished.

But there are other things that will last while the sun and moon, the sea and rain endure, and running water is one of them. High ground with lakes and streams and a good rainfall is a national asset of incalculable value. Here Canada has few competitors or even peers, and the study of her water powers is one of the most fruitful fields of investigation.

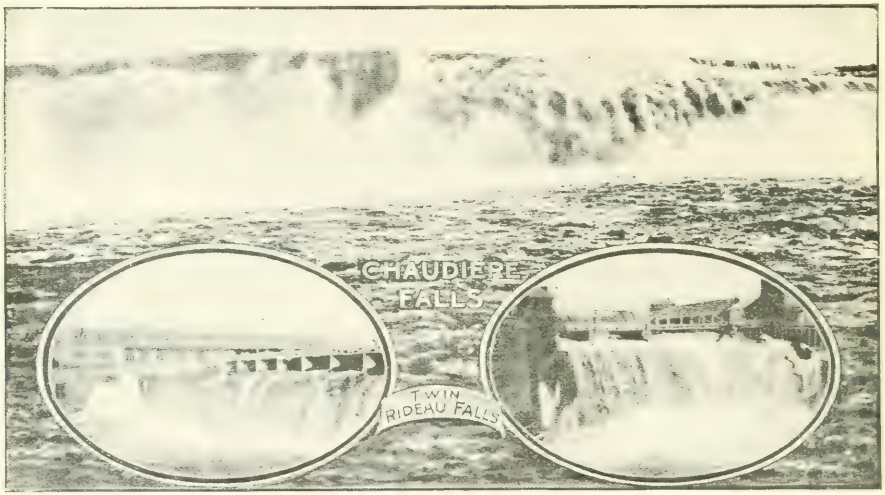
The Canadian Shield (see plate) is not a mountainous region, but a rough plateau with steep edges rising from the Great Lakes, Hudson's Bay and the St. Lawrence to a height of from 1-2000 feet above sea-level, on which the average annual rainfall is not less than 30 inches. The water-power is scattered over a huge area and is more available at some places than others, no doubt, but is all capable of immense and useful development for local uses. Up to their capacity the falls are inexhaustible, but their capacity though very large is necessarily strictly limited.

Niagara.—The greatest of the falls is Niagara, which does not descend directly from the high ground, but what is far better, flows out of one great reservoir into another at a much lower level. To the man in the street the power derivable from the immense and lovely torrent may appear inexhaustible, a fountain of energy that can never be dried up by any exertion of human ingenuity. But human ingenuity, especially in America and where dollars are at stake, can work marvels, and the drying up of the falls is one of them. A very curious international situation has arisen from this cause in connection with Niagara which probably few people in the United Kingdom have heard much about.

Ownership of the Falls.—Half the Niagara Falls and more than half of the water in them belongs by treaty to Canada, and the International Boundary follows a fixed line independent of any change in the volume of the river. Now the Americans have already practically used up all the water on their own side to provide electric current to a great district, including the State of New York. In addition to this vast absorption of energy, they have for some years been drawing from the Canadian side as well, where Canada did not immediately require to use all the available energy. On the supposition that Canada would never be

likely to use up all her surplus water-power, and would continue for all time to supply the United States, various large works have been erected that depend on this surplus being provided to the Republic. But now the Americans have begun to propound the novel doctrine *that the States have acquired a vested right to a continuation of the supply, no matter whether Canada may need it or not.*

On the Canadian side Toronto, Ottawa, Montreal, and over 100 towns and cities all over Ontario are supplied with electric current from Niagara and other rivers, and the time may soon arrive when they will have no surplus power to dispose of. It is thus unreasonable to expect Canada to give away, and that to such a much richer nation, a commodity



Illustrations of Ottawa's water powers.

that has become one of the indispensable necessaries of her own existence.

Conflicting Interests.—Another important question of a different kind affecting the efficiency of Niagara has had the attention of the commissioners. The city of Chicago is situated at the southern end of Lake Michigan, the natural overflow of which enters Lake Huron and passes through Lake Erie to the Niagara River. The site of Chicago is a very low and narrow watershed, only eight or ten feet above the level of the lake, and very little excavation would suffice to cut through this and draw off the water into the head of the Illinois River, a tributary of the Mississippi. The sanitary needs of Chicago have led to the drainage being thus diverted southwards into channels leading ultimately to the far off Gulf of Mexico.

By special legislation the city has for some years been permitted thus to draw off 250,000 cubic feet of water per minute. But certain producers of power on the Illinois River some years ago found it greatly to their advantage to use this privilege to abstract surreptitiously far more

than the specified quantity from Lake Michigan. They were found to have, contrary to the American regulations, diverted 400,000 to 600,000 cubic feet per minute, and thereby to have lowered the level of the lakes and affected the flow and navigation of the channels between them, and also the flow of the Niagara River. This enhanced supply developed a horse-power of 30,000, which it was admitted produced a revenue from the power station at Joliet, Illinois, of $900,000, or £180,000, so that it was a matter of great importance to the owners of the lucrative plant not to let it be restored to the *status quo* (*Report*, p. 141). But on this occasion the damage was sustained among others by the riparian manufacturers of the United States as well as by Canada, so that Canada was supported by the Washington Government in the action that was raised to interdict this proceeding. This is one reason, no doubt, why the power of Niagara Falls is being so quickly used up. The perimeter of the Falls in 1900 was 3950 feet, but in 1915 this was reduced to about 3400 feet, and the amount of water falling on the American side did not exceed seven per cent. of the whole. The Boundary Waters Treaty limits the amount of water-power to be diverted to 36,000 feet per second (equal to 425,000 horse-power,[1] of which Canada is entitled to 20,000 cubic feet, or 236,000 horse-power. The abstraction of the water at Chicago is thus bound to make a sensible difference in the already reduced volume of the Falls.

Niagara is the most conspicuous source of water-power in North America, but there are multitudes of other places where water-power can be developed on a great scale, where no troublesome question of water rights can arise if due precautions are taken in time by the government. However, there lurks here some danger also. It is pointed out in the *Report* that in the United States during recent years several wealthy corporations have been quickly buying up the best waterfalls, not to develop power immediately, but to hold them, as real estate owners hold land, with a view to selling it at an enhanced price later on, or to prevent others from doing so. It is evident that the greater part of the water power in the States is becoming concentrated in fewer hands, and a vast monopoly is being built up to benefit these corporations at the expense of the community. In 1908 the thirteen greatest groups of interests controlled a total of 1,800,000 horse-power developed and undeveloped, and in 1913 ten only of the greatest groups had under their control 6,300,000 horse-power. The concentration in ownership increased in these five years about seven times faster than the power development. Instead of spending their money in developing the power sites they had acquired, the power interests had been buying and holding new sites to meet not a present but a future demand (p. 138).

Now this noxious malady may very easily infect Canada, if indeed the process has not already begun. When the country is in a position to make use of its water powers, it may some day wake up to find that the best of them have been already cornered by far-seeing millionaires and trusts who could afford to wait, and had long ago made themselves

[1] *Heaton's Annual*, 1916, p. 409.

masters of the situation. Adequate legislation in each province is thus needed to protect the public against the greed of rapacious syndicates, before they have had time to do any mischief.

Other Water Powers.—Eastern Canada and Quebec, with its high northern hinterland, is well provided with falls, and Manitoba has also a great supply of water-power in the Winnipeg River, where by suitable works half a million horse-power can be developed in time. In Saskatchewan, and the Athabasca and Peace Rivers in Alberta, there is likewise an immense reserve of water-power for the northern prairies. Since it has become possible to convey electric power to distances of between 200 and 300 miles from the source, it is obvious that an important factor in the settlement of these territories is to be found in the proper utilisation of their flowing waters.

British Columbia.—In British Columbia, with its mild and moist climate and lofty coast range, the possibilities of the falls are still greater. Vancouver and Victoria are already supplied with electricity from this source, but the larger proportion of the water powers are neither developed nor even estimated. In the Eastern and Central Provinces the intense cold of the winter months when the streams freeze up is of course a serious drawback, and this becomes greater the further north we go. But here British Columbia has the advantage over all other parts of the Dominion. Along the Pacific slope there is not even much snow, but abundance of rain gushing down from the pine-clad mountains, especially in the winter months when the precipitation is heaviest.

More than a million horse-power has already been developed in Canada, but it is safe to say that this is not a tenth of the power that may be utilised at some future time. In her waterfalls the Dominion has an incalculable supply of wealth laid up and waiting to be used by generations yet to come, one that cannot be wasted or worked out or destroyed, that is not concentrated at one place but scattered about, particularly in those places which have not been blessed by nature with consumable subterranean stores of energy and light.

Conclusion.—The area of Canada is 3,730,000 square miles, which is greater than that of the United States including Alaska, and a little less than that of Europe. The northern territory is, however, for the most part too severe in climate for the permanent residence of white men, and only the more temperate zone can ever become thickly populated. I have attempted to indicate very imperfectly some practical directions in which the country may be developed, and a few things to be avoided if the natural resources are to be employed to their fullest extent. Canada is still a young country with only about eight millions of a population, which up to the outbreak of the war had been growing rapidly, and no doubt will resume its growth after hostilities are over. There is ample room for many additional millions, but there is no room for waste, and the loss of available capital during the war will for a time greatly restrict the flow of British money required to open up the Dominion for wider settlement. That there has been prodigious waste and injurious speculation in some directions does not need to be again

repeated, except to say that the war may be a blessing in disguise if it only leads to more economy and greater attention to the development on sober and wise lines of these immense natural resources that have been summarised in the foregoing pages, and commented on at greater length by Professor Adams and the other distinguished members of the Conservation Commission.

THE WAR AND THE EAST.[1]

By Lieut.-Col. A. C. YATE.

WHO will be the historian of this world-wide war, which now, curiously enough, is converging upon the scene of several of the world's most famous conflicts? Homer's little armies fought across the Ægean for the passage of the Dardanelles. Herodotus brings Persian and Greek face to face, and again the Hellespont plays a conspicuous part. The names of Troy and Abydos have to-day almost passed into the realm of myth, while those of the Dardanelles, Constantinople and the Bosphorus, loom ever larger before the whole civilised world. The years A.D. 1204 and 1453 record—if we except the events of 1877—the last two great sieges of Constantinople. In the one the Western Church and Empire assailed the Eastern; in the other Moslem overcame Christian. To-day votaries of both the Western and the Eastern Church have united to cut Islam apart from the Dual Alliance of Catholic Austria and Protestant Germany. And yet, it is not a religious, but a political war. In the background looms Shintoism, Buddhism, and Hinduism; but it is not the fate of any one of these faiths or of Christendom that hangs in the balance, but that of the Briton, the Frank, the Slav, and the Teuton, and incidentally of Islam. For that religion, and indeed, if we heed Teutonic precept and practice, for the Christian also, this war is of the highest import. Will a second Gibbon arise, able and willing to devote a lifetime to the greatest political, religious, economical and industrial crisis that the world, as far as we know, has ever seen?

The hub of the universe, when Hiram reigned over Tyre and Solomon at Jerusalem, must have rested somewhere in the vicinity of the fabled first home of man, the Garden of Eden. From the seas on either side of that land of the four rivers, mariners sailed east and west, from Phoenician ports to the Pillars of Hercules, the Fortunate Islands and Ultima Thule, and from the Red Sea and Persian Gulf to the land of the Queen of Sheba, to Ind and to far Cathay. Cadiz was the site of a Phoenician colony in 1100 B.C. Communication between the Near East and Far East in pre-Mahommedan days is outside the sphere of this article. Dr. Robertson's treatise on the Antients' knowledge of India deals with it. The Arabs, the moment the Prophet gave the word, spread like wildfire east and west, across Iran to India and Turan, and across

[1] From an article entitled "Berlin in quest of Asiatic Dominion," published in the *Journal* of the Royal United Service Institution for February, 1916.

North Africa into Spain and France. Their fleets at once entered and contested the *maîtrise* of the Mediterranean.

The Abbé Renaudot published two centuries ago the diary of two Mussulmans who made the journey from the Persian Gulf to China in the ninth century A.D., as their forebears, including Sinbad, had made it from Basra to Canton for centuries before them. For eight hundred years Islam stood alike as a barrier and a link betwixt East and West, acting as middleman between Cathay and Ind on the one side, and Genoa, Venice and Bruges on the other. Then Portugal rounded the Cape and broke the spell. If Islam had its proselytising message for the shores of the Mediterranean, Christendom had hers for the coasts of India and China, and so it repeats itself to this day. Bishop Heber a century ago hailed Afric's sunny fountains and India's coral strands ; but to-day one hundred millions of Moslems send their message as an integral and powerful unit in the heritage of the British Crown ; and the reply which His Majesty's Ministers have made to that message is : that Islam itself will pronounce judgment on the Khalifate, when the war is concluded. The Right Hon. Ameer Ali, a recognised authority, thus wrote to the *Times* on 24th April 1915 : "The question of the Khalifate concerns not merely the Mussulmans of India and Egypt, but affects equally the religious interests of the Moslems of Russia, of the French and British possessions in Africa, of the Malayan Peninsula, and China. To them the existence of an independent Khalif, as the spiritual and religious chief or Imam, is essential for the valid performance of prayers and other religious duties. The *Imams* who lead the prayers in mosques act as his representative. The subject is one of extreme delicacy and difficulty." The practical submission of the Sultan and the government of Turkey to the Kaiser's control has split Islam into two camps, the one siding with the Sultan and Germany, and the other with the Allies. This is very far from being the first time in the annals of Christendom and Islam that the two have been found in alliance against their own co-religionists. Almost concurrently with Charles Martel's famous victory at Tours we find Eudes, Duke of Aquitaine, giving his daughter Lampegie in marriage to the Moslem Governor of Cerdagne, and entering into an offensive and defensive alliance with him. East dovetails into West without much coaxing.

It is a curious coincidence that the last great inroad of Asiatics into Europe was almost contemporaneous with the first essay of European navigators to reach the Indies and Cathay. In 1480 the Khan of the Great or Golden Horde and Ivan III. of Moscow mustered their rival armies on the banks of the Oka, a small river to the south-east of Perm and adjacent to the Ural Mountains. The Russian Prince had refused to pay tribute, and the Khan came intending to enforce its payment. But a Russian army, computed at one hundred and fifty thousand, defending the passage of the Oka made him pause ; and, finally, he decided to withdraw and forgo his tribute. The liberation of Russia from the Tartar-Mongol yoke dates from this incident. Just seven years later, *i.e.* in 1487, Bartholomew Diaz rounded the Cape of Storms ("Good Hope" of to-day) and in July 1497 Vasco de Gama sailed from Lisbon on his quest of the south-east passage to the Indies. Guided by Arab pilots, whom

he engaged on the east coast of Africa, he reached Calicut in July 1498.

The four European powers who first entered the field of maritime and mercantile enterprise in the East (the famous Bull of Pope Alexander VI. sent Spain westward) were, consecutively, Portugal, Holland, England and France. The merchant adventurers of these nations operated mainly by sea; but of Englishmen, Jenkinson, the Sherleys and Jonas Hanway; of Frenchmen, Thevenot, Tavernier and Chardin; and the Venetian Vincentio d'Alessandri, not to mention many others, travelled by land. All four nations established themselves between 1550 and 1660 in India, the Persian Gulf, the Malay Archipelago, and the islands of the Indian Ocean, and on the coast of China.

Russia meanwhile had pushed steadily eastward. By the middle of the seventeenth century, Cossack explorers had reached the Amur and the Sea of Okhotsk by land, and the Behring Straits and Kamschatka by sea along the north coast of Siberia. Of these five powers, at the present day two, Britain and Russia, retain vast—two, Holland and France, extensive—and one, Portugal, limited possessions in the East. Within the last thirty years the Teuton, after long sojourn in Europe, has come forward as a sixth aspirant after Asiatic dominion. His aspirations do not appear to stir sympathy or enthusiasm in the oriental breast; for our Aryan brother in India has come over to Europe to oppose the pretender who, having forsaken in pre-Christian times the Steppes of Central Asia for the shores of the Baltic and North Sea, now hankers after the Garden of Eden as a Teutonic granary. Still, we should be blinding our eyes to historic fact, if we denied that the Teuton had not an equal claim to an Asiatic heritage with Slav, Frank, Anglo-Saxon and Dutchman. Hungary and the Holy Roman Empire became by their very geographical position the pre-ordained barriers to the ambitions of the Ottoman monarchs. The two great sieges heroically borne and successfully resisted by the garrison and population of Vienna are landmarks in history, just as are the two famous sieges of Rhodes in 1480 and 1522. The names of the Hungarians, Hunyadi, and Matthias Corvinus, of Don John of Austria, the victor of Lepanto, and of the Pole John Sobieski, remind us that Europe and Christendom owe to them the same debt of gratitude that it owes to Charles Martel. Scanderbeg was no Teuton, but in his days he was a power and has left a name in Albania which the German Prince William of Wied might, a year ago, have honestly envied. The Teutonic Knights of Marienburg, when the Holy Land no longer found a home for them, wielded against Letts and Poles the sword of proselytisation with a zeal only equalled by that of the Moslems who in the seventh and eighth centuries spread the faith of the Prophet to Persia, India and China in the east and to the Straits of Gibraltar in the west. The Johanniter Order of Brandenburg and Prussia maintained the fame and traditions of those Hospitallers who held Rhodes and Malta for six centuries against the armies of Mahommed II. and Suleiman the Magnificent, the fleets led by Barbarossa, Piale and Dragut, and the corsairs of North Africa. The Holy Roman Empire stood as a bulwark against the Turk until the siege of Vienna in 1683.

The highwater mark of Ottoman aggression was reached there. Since then Turkey has stood, for the most part, on the defensive. With the advent of Peter the Great to the throne of Russia, Muscovite pressure began to tell upon the Turkish territories north of the Black Sea; and English squadrons, notably that under Lord Exmouth, taught Algiers and other corsair strongholds severe lessons. At Navarino a combined British, French and Russian fleet crushed the naval strength of Turkey, and Greece asserted herself. A few years after that, the first German officer, one destined within forty years to attain a world-wide reputation—Captain von Moltke, joined the staff of the Sultan Mahmud, about 1832, and organised the Turkish forces against Egyptian aggression and French ambition in Syria. While visiting those countries and moving in the highest Turkish social, political and military circles, von Moltke could not fail to pick up a wealth of ideas and plans.

If we look back into the annals of English enterprise alone in regard to railway and maritime communication between Europe and the East, the schemes that originated in British brains open our eyes. The names of Chesney, Waghorn and Andrew are still familiar, but who knows that a scheme for a Calais-Constantinople-Calcutta Railway was put forward by Mr. William Pare of Dublin in 1842? It is barely four years since the Central Asian Society invited me to lecture before it on the Anglo-Russian project for a trans-Persian railway. I then said that such a line would ultimately reach Calcutta, and in due course the Pacific coast of China, and I imagined my idea was original. Mr. William Pare in 1845 had proposed the very same line, designating it "The Atlas Railway." Messrs. Campbell, Wright, Thomson and R. M. Stephenson, all and each evolved cognate schemes between 1845 and 1851. Ostend, Vienna, Belgrade, Constantinople, Aleppo, Baghdad, Karachi, was the suggested alignment. We see clearly that Europe and the Ottoman Dominions were at that time fully alive to the fact that Turkey in Asia was the possible route of the greatest railway then projected. The subject can hardly have escaped von Moltke's notice and thought. Russia was even then making her influence felt in Central Asia, through which her railways now extend to Andijan close to the Chinese frontier, while the P. and O. Company was developing that overland route which has made it, now that it has been amalgamated with the "British India," probably the most powerful shipping company in the world, and the largest contributor to the funds of the Suez Canal, the safety of which now depends on the protectorate of the British Empire.

If the German Empire, therefore, sought a path to Asiatic Dominion, it had to drive a wedge right in between the Russian sphere of influence on the north, and the British on the south. We can well surmise that this thought germinated in the Moltkian mind, and that later it was transplanted to the brains of the leading statesmen of Berlin and Vienna. Beaconsfield, who had in 1876, at the suggestion of Mr. Frederick Greenwood and with the help of Lord Rothschild, bought up Ismael Pasha's Suez Canal shares, went to the Berlin Conference in 1878 with a cut-and-dried plan in his mind for a railway from Alexandretta to

Baghdad, a railway for the protection of which he had secured Cyprus. England at the time stood well with Turkey, but the Teuton was even then beginning to cut the ground away from under her feet.

When the Crimean War broke out in 1854, Austria and Prussia showed promptly that they were not indifferent to Russian action on the Danube and in the Balkans. They warned Russia off. In 1869 the Crown Prince Frederick of Prussia secured a *pied-à-terre* at Jerusalem in the "Muristan," the site of the earliest chef-lieu of the Hospitallers. The presentation of that site to the sovereign head of the Johanniter Order was a graceful act on the part of the Sultan Abdul Aziz, who cannot then have foreseen the close relations which would unite his successor Abdul Hamid to the son of the Crown Prince Frederick. At that time Italy, Rome and the Vatican were in the throes of transition, and the English Hospitaller Grand Priory had not yet arisen from the ashes of the sixteenth century. The Johanniter Order stepped in at the psychological moment.

1870-71 brought the consolidation of the German Empire under the hegemony of Berlin, and then it was that Bismarck felt that the hour for the expansion of Germany had come. We might almost suspect that, when the Emperors William and Francis Joseph, attended by Bismarck and Beust, met at Salzburg in September 1871, the conception of the scheme whereby the Teuton, not the Slav, should dominate Constantinople, and construct a great line of communication from the North Sea *via* Vienna to Constantinople and the Persian Gulf, had taken place. Later, in 1912, when this scheme had progressed far, and Germany's aims were clearly seen, von Bernhardi boldly outlined what it meant for Britain. He says:—"Turkey is of vast importance to us. She is our natural ally; it is emphatically our interest to keep in close touch with her. Turkey is the only power which can threaten England's position in Egypt and thus menace the short sea route and the land communications to India. We ought to spare no sacrifices to secure that country as an ally for the eventuality of a war with England and Russia. Turkey's interests are ours." Germany has not only spared no sacrifices but *has* secured that ally on which she set so much store in the eventuality of war with her two great rivals for Asiatic Dominion. A quarter of a century ago an Austrian author, Popowski, published at Vienna a book which, in the light of later experience, was obviously intended to foster jealousy and estrangement between Britain and Russia. The move was clever, but ten or eleven years ago Lord Lansdowne detected the embryo that lay in the womb of the future, and sought a *rapprochement* with Russia. We see the result in the present war.

Mr. J. B. Firth (*Fortnightly Review*, May 1915) may be honestly complimented on the happy and pithy expression "Cyprus is the Heligoland of the Levant." We British may yet have to be thankful that Greece declined that "Heligoland." Our British sphere in the Middle East is Egypt, Arabia, Mesopotamia, Persia and the Persian Gulf. With Palestine and Asia Minor we have no thought to meddle: but Cyprus is a strengthening link in the chain Gibraltar-Malta-Cyprus-Port Said. It overlooks the Asia Minor coast from Mersina to Beyrout,

and flanks the Baghdad Railway between the Taurus and Aleppo. England must keep, fortify and garrison it. Berlin may, on the conclusion of this war, continue to control the "B.B.B.," as the Berlin-Byzantium-Baghdad Railway is familiarly termed in German circles. The British sea-to-sea line by rail may very well be from Alexandria *via* Cairo, Suez, Akaba, El Jauf to Basra and Koweit. This is the line that Mr. C. E. D. Black advocated in October 1911 before the Royal United Service Institution, Sir Mortimer Durand presiding. I did not then think that his project could hold its own as a rival of the "B.B.B.," and I said so at the discussion which followed his lecture. The political conditions now prevailing oblige me to alter that opinion, and I have more than once stated, in view of our position in Egypt and Mesopotamia, that those two countries must be directly connected by rail, and that that railway will be *the* British line to the East.

Afghanistan cannot for ever exclude railways. Askhabad, Merv and Samarakand are waiting to establish connection with the railways of India through Herat and Kandahar on the west, and Balkh and Kabul on the east. This outline of the railway enterprise that waits upon Asia, when war has decided the Asiatic destinies of Britain, Russia and Germany, points to India as the coming Euro-Asian Railway Emporium. Stupendous Himalayan and trans-Himalayan mountain ranges, backed by the Pamirs, the Tibetan Plateau and the Gobi Desert preclude railways on the north, but the Indus Valley on the west and that of the Brahmaputra on the east are the gates by which great international railway systems will enter and leave India. The recent Viceroy, Lord Curzon of Kedleston, is the one whose comprehensive intellect has grasped those issues, and when he selected "Frontiers" as the theme of the Romanes lecture of 1907, it was that to which his wide travel and study and his Asiatic experience had qualified him to do justice. Diplomatists share with their fellow-men liability to error. The Berlin Conference of 1878 has taught us, nearly forty years after the event, that our statesmen of that date blundered when they encouraged a rival power to Russia in the Near East. Austria, as representing the Holy Roman Empire, which checked Russia in the fifteenth, sixteenth and seventeenth centuries, must long have indulged in day-dreams of an Empire that touched the Ægean Sea; and, when Salonika was commonly spoken of as a possible rival of Marseilles and Brindisi as the Indian mail land-terminus, Viennese ambition saw in that haven of the "chosen race" the coping-stone of its aspirations.

GEOGRAPHICAL NOTES.

Asia.

Locusts in Syria.—Attention may be called to an article in the *National Geographic Magazine* for December describing a locust invasion of Syria which took place at the end of February 1915. The actual invasion displayed no special features, beyond those to which geographers

and naturalists are accustomed, but the article is noteworthy because of its very remarkable illustrations, and because it contains a number of minor details in regard to the insects, some of which seem to be new. The author, Mr. John D. Whiting, together with other members of the American colony at Jerusalem, made desperate efforts to save certain fields, gardens, etc., lying along the line of invasion, and the description of the futility of these efforts, made necessarily upon a somewhat small scale, is very striking. Enormous numbers of the insects were destroyed, but the effect on the total number was negligible. The futility of the measures taken by the local authorities to deal with the plague is also remarkable. Apparently little attempt was made to destroy the first winged swarms, and the females were permitted to lay their eggs on an extensive scale. When this was realised a proclamation was issued requiring every male inhabitant between the ages of sixteen and sixty to collect eleven pounds of eggs, without, apparently, any instructions being given as to where these were to be found, or the measures to be taken to collect them. The regulation was evaded in many ways, one of the most interesting being the production of artificial "eggs" made of white clay, which were readily accepted by the authorities. The result was that myriads of larvæ hatched, and began their characteristic migrations. Striking descriptions and illustrations are given of these swarms, which in some cases were so dense as to delay trains, owing to the greasy condition of the lines, due to the crushed bodies, while on the roads, for the same reason, horse traffic became difficult. The young larvæ are described as hopping like fleas, and the wave of movement so produced over surfaces where they were abundant, gave rise to a peculiar dizziness and a sensation resembling sea-sickness in the spectator. The locust hosts not only progressed in this fashion on the level, but also climbed up walls and buildings, invading houses as well as gardens. The first invasion of the winged forms, as already stated, took place at the end of February, and by mid-April eggs had been laid on a great scale. No date is given for the first appearance of the young brood, but it is noted that by June 10 they had run through the early stages and become flying forms. These adults completed the destruction wrought by the young, attacking especially the olive trees, which were neglected by the young, also prickly pears, palms, and generally most trees with a few exceptions. These adults, however, only seemed to remain some two days in the country, and subsequently collected together for migration, which only took place when a strong west wind was blowing, this carrying them due east in dense swarms. A vivid picture is drawn of the effect of the locust invasion upon the various crops, but the account suggests that much of the damage might have been averted by more systematic and better combined efforts to deal with the plague at the outset.

Communications in Asiatic Turkey.—The *Times* military correspondent contributes to that paper an interesting article on this subject, in regard to which it is not easy to obtain detailed information. Troops and supplies from Europe for Asiatic Turkey have to be shipped

from Stambul to the railway station of Haidar Pasha on the Asiatic shore, but from this point there is continuous railway communication to Bozanti, on the northern slopes of the Taurus range, in the south-eastern corner of Asia Minor. This distance, it is interesting to note, is almost precisely the same as that from Belgrade to Constantinople (1030 kilometres, or about 650 miles, as against 1050 kilometres in the latter case). At Bozanti there is a break in the line, both a long tunnel and a viaduct being required. Unless this gap has been filled, which is unlikely, a road stage of some 40 miles is necessary here, through the Cilician Gates. The pass reaches a height of over 3000 feet, and is remarkable for the furious winds which blow through it. After another section of completed rail, passing through the town of Adana, there was, before the war, a second break in the line, the tunnel through the Amanus range being uncompleted. It is just possible that this gap may have been filled by this time. Beyond the Amanus mountains the line runs to Muslimie, to the north of Aleppo, and here it bifurcates. The northern branch runs north-east to Jerablus on the Euphrates, and at this point the river can be used as an alternative line of communication with the Baghdad district, supplies and ammunition being conveyed on rafts built on inflated skins. Beyond Jerablus the line, before the war, was continued east to Ras-el-Ain, and is shown on most of the recently published maps as being completed beyond this point to Nisibin. The *Times* correspondent, however, regards this as doubtful, for rails were wanting before the war, and it is not likely that they can have been sent since. If road transport is necessary all the way from Ras-el-Ain there are two possibilities. Supplies and ammunition probably go by Nisibin and Chelakha to the Tigris, and use the river down to Baghdad, while marching troops may go to Mosul and then pass to the east of the river, *viâ* Kirkuk. They will join the Tigris again at Jibbara, where begins the short section of rail leading to Baghdad.

The Syrian lines of rail, which start from the bifurcation at Muslimie, are single, of one-metre gauge, and have very steep gradients. The main line runs through Aleppo, Homs, Damascus, and so on to Medina, with a branch to Haifa. From some point on the Haifa branch line a new route probably runs southward through Jerusalem and Hebron to Beersheba, and from Beersheba this line is probably continued to a short distance beyond El Auja, near the Egyptian frontier. It is uncertain whether this line is to aim at Suez or Ismalia, and it probably suffers much from the want of rolling stock and of coal.

Within Asia Minor the most important branch line is that which comes off from the Haidar Pasha-Konia line at Eskishehr and runs to Angora (Haidar Pasha to Angora, 576 kilometres). From Angora a bad road runs east to Sivas, a distance of 435 kilometres (about 270 miles), while the stage from Sivas to Erzerum, also bad, is of similar length. Sivas can also be reached from the Konia line direct. In this case the railway is taken to Charjeu (Haidar Pasha-Charjeu, 967 kilometres), south-east of Konia, and a fairly good road leads by Nigde and Kaisarie to Sivas, a distance of about 255 miles. It will be obvious from this description that the Turks are considerably handicapped in

Asia by the difficulty of sending troops and supplies to Armenia, and that the Russian advance is menacing their communications with Mesopotamia.

The Rainfall of Cherrapunji.—Mr. Andrew Watt publishes in the *Journal* of the Scottish Meteorological Society (vol. xvii.) an interesting note on this subject. Cherrapunji, placed at a height of a little over 4000 feet on the slopes of the Khasi Hills, is always given in geography books as the wettest place on the globe, but it appears that some of the earlier figures are untrustworthy. The most recent forty-year period gives an annual average of 425 inches, and this figure may be accepted as authoritative. As regards the months of fall, about three-quarters of the total occurs in the months from June to September, *i.e.* during the south-west or summer monsoon, but there is also a considerable fall from March to May, this precipitation being related to a local wind system in the eastern portions of the Bay of Bengal. At this time thunderstorms are not infrequent, and the rain brought by them, which is not monsoonal in character, is very important for the tea plantations of Assam. Of the remaining months November, December, January and February are all dry, December having only an average of ·2 inch, and January of about ·7 inch. In the forty-year period the minimum and maximum annual falls were respectively 283 inches and 550 inches. During the summer rainy period rain falls practically every day, and some very heavy daily falls are recorded. Thus on June 14, 1876, nearly 41 inches of rain fell, an amount greater than that registered in Edinburgh during the whole of the wettest year on record. Heavy individual falls of this kind are associated with shallow cyclones, superimposed upon the main summer monsoon system. Such storms occasionally carry heavy falls of rain to regions which are ordinarily arid. Thus, on July 8, 1910, nearly 11 inches fell near Karachi, a place whose average annual rainfall is less than 8 inches.

The Peoples of Northern and Central Asiatic Turkey.—In an article with this title, well illustrated by maps and photographs, which appears in the *Bulletin* of the American Geographical Society for November last, Mr. Leon Dominian discusses in an interesting fashion the natural regions of Asiatic Turkey and their inhabitants. He points out that each of the six natural regions into which the area can be divided is inhabited by distinct human groups, differing from one another by religion or language, or often by race. Thus the well-watered coastal belt which fringes Asia Minor is chiefly Greek and Christian, and it is only here that western thought and art have obtained a foothold in Asiatic Turkey. The true Greek is only found within reach of the sea, and is by instinct fisherman, sailor, and trader. Where occasion arises he develops from petty trade into business man and speculator. When he leaves the coastal belt he loses his special characteristics and becomes merged into the predominantly Turkish and Mohammedan population of the steppe-like interior. The name Turk applied to the peoples here has no racial significance, for they are of

extraordinarily mixed race, the pure Tartar vagrant being in the minority. To this day, however, the centre of Asia Minor is still being penetrated by true Asiatic nomads, as it has been in the past. Most of the present day incomers are from the Kirghiz steppes, and are influenced, according to their own accounts, by a desire to change from a Christian to a Mohammedan state. Changes in frontier lines in the Balkan Peninsula bring also immigrants from that region into Asia Minor, these being actuated by a similar unwillingness to live under Christian rule.

Eastward of the Anatolian plateau we come to the mountainous region of Armenia, the homeland of the Armenians, who are generally Christian but sometimes Mohammedan. The author believes them to be nearly related to the ancient Hittites, but with an Iranian strain, whose effects are more marked in their social polity than in their physical type. The relation of the high Armenian plateau to the Pontic and Anti-Taurus ranges forbids migration either to north or south to these peoples, but on the other hand the way is open both to the east and west. The topography, consisting of many valleys separated by highland, makes the rise of a united people difficult, but Mr. Dominian emphasises the part played in Armenian history by the plain of Van, of which he gives a striking photograph. His picture of the Armenians is more favourable than that of some other writers, and he dwells on the fertility of the valleys and on their productivity, as well as upon the surrounding rocky mountains with their severe climate as helping to explain the peculiarities of the people.

Intermixed with the Armenians, and extending also down the slopes of the mountains towards the plains of Mesopotamia, we find the Kurds, who are sometimes partially nomadic, and in other cases are sedentary. They are of mixed race, but are believed by the author to have a marked Indo-European strain.

The fourth great natural region is formed by the narrow corridor of Syria, which is blocked to the north by the Amanus range (Alma Dagh), and to the south by the desert of Sinai. As a land-bridge Syria has been traversed and inhabited by a great number of races, and at the present time the population of the south defies analysis. On the other hand to the north various separate groups, sometimes of nearly pure race, are distinguishable, such as the Druzes, the Maronites, etc.

The two remaining natural regions consist of the desert belt and the Mesopotamian lowland, and these are peopled, so far as the majority is concerned, by Arabs. In the desert are found the Bedouins, the purest living representatives of the Semitic race, while the people of the plain watered by the Tigris and Euphrates are of more mixed origin.

Mr. Dominian sums up the various stocks represented in Asiatic Turkey as follows. The central highland belt he believes to have been the first home of Alpine man, or the Armenoid stock. This race is now represented in its purest form in some of the independent Mohammedan communities of Anatolia and among the Maronites and Druzes of Syria. But from the east and the south at least three other stocks poured into the area. These included a Turki element from the grasslands of the

Altai, a Semitic element from inner Arabia, and an Iranian element from the plateau of Iran. From the west the region was penetrated, to a greater or less extent, by Mediterranean man, advancing up the river valleys. The mingling of these various strains, in varying amounts and degrees, has given rise to the numerous peoples of to-day, who are almost all of mixed origin.

AMERICA.

A Terrestrial Crater of the Lunar Type.—A short article with this title appears in *Nature* for January 27, the name being applied to a peculiar ringed depression in Arizona, formerly called Coon Butte and now renamed Meteor Crater. The crater has been studied in detail by Mr. D. M. Barringer, who read a paper on the subject before the U.S. National Academy of Sciences. The crater is situated in Northern Central Arizona, 70 miles from the Grand Canyon of the Colorado, and only 2½ miles from the Canyon Diablo, which has innumerable scattered meteorites. Described by the author of the article in *Nature* as one of the most striking features of the earth's surface, the crater consists of a depression, circular in form, and about 4000 feet in diameter, with a rim that rises 570 feet above a floor which is level except where obscured by talus from the rim. The rocks in the neighbourhood are identical with those of the Grand Canyon, and consist of horizontally bedded sandstones and limestones. But in the crater rim these rocks have undergone violent disturbance, and dip away from the centre at all angles up to 90°. Further, for distances up to two miles from the crater ejected fragments of the rocks are found, the limestones being in great blocks, while the sandstones are finely divided, and show signs of having been subjected to most intense mechanical forces. Nevertheless no signs of volcanic activity have been observed anywhere in the immediate vicinity, although countless fragments of the Canyon Diablo meteorite occur in and around the butte, and up to a distance of five miles from it. It is generally acknowledged that the "crater" is of non-volcanic origin, and Prof. G. K. Gilbert's theory that it is due to the impact of a great meteorite or group of meteorites has met with very wide acceptance. The great difficulty in regard to the suggestion is that there are no signs of the great mass of matter supposed to have produced the hollow and the shattering effect. Prof. H. N. Russell has argued that the effect may have been produced by a "wad" of air driven before it by a great meteorite or group of meteorites, air which would have an explosive effect as it escaped round the edge of the mass when this impinged on the surface. The suggestion still leaves unsolved the problem as to whether the supposed meteoric mass has disappeared by oxidation, or is deeply buried. The author of the article, as the title indicates, emphasises especially the apparent resemblance to the vast craters of the moon.

Irrigation in the Western United States and Bird Migration.—In a *Bulletin* (No. 185) of the U.S. Department of Agriculture devoted to Bird Migration an interesting little point is mentioned which

illustrates the far-reaching effects of human activities. The bobolink or rice-bird is a common songster in the Eastern United States. It winters in Central America and the West Indies, and the passage of the migrating flocks in spring up the eastern coastline, and the return journey in autumn have often been described. Hitherto the bird has been excluded from the western states because, being a frequenter of damp meadows, it cannot cross the intervening arid belt. But since the advent of irrigation and the consequent spread of cultivation it is extending its range westwards, and is said now to occur in nesting colonies almost up to the Pacific. Curiously enough, however, the return journey is said to be by the old route, through the eastern states, the birds not having learnt to take a short cut across New Mexico to the Gulf Coast of Texas. The bird frequents grain fields generally, not only rice fields, and the fact that it is now travelling westward with the extension of cultivation is a somewhat interesting point.

The St. Lawrence River.—Mr. R. H. Whitbeck publishes in the *Bulletin* of the American Geographical Society for August last an article on the part played by the St. Lawrence river in the making of Canada, which contains some interesting points. The river flows in a shallow trough, filled by eroded and tilted Cambro-Silurian sediments, which lies between the old rocks of the Laurentian plateau on the one hand and those of the Appalachians on the other. At one period the whole trough was submerged to at least 600 feet below its present position, and the silts deposited at this period of maximum submergence give rise to a fertile strip of land on either side of the river above Montreal. But, notwithstanding the uplift, the valley is still deeply submerged, and can be traced across the continental plateau south of Newfoundland, 1000 miles beyond the present head of ocean navigation at Montreal. Between Montreal and Quebec the river cuts through a belt of hard slates and is considerably narrowed. It is this narrowing, together with the commanding heights on the north side of the river, which gives its strategic importance to the town of Quebec. The drowning of the St. Lawrence valley is of great importance in connection with commerce, for it enables ocean-going ships, during the greater part of the year, to reach Montreal without difficulty. It is noted as an interesting comparison that while New York is at the mouth of the Hudson, and New Orleans 100 miles up the Mississippi, Montreal is 1000 miles up the St. Lawrence. The direction of the last river is also important. In so far as it flows eastward it is more advantageous for commerce than the Mississippi, "every league towards whose mouth is probably half a league further from your destination." It is further of great importance that the river, as has often been pointed out, flows from the part of Canada which has fertile soil, a mild climate, access to various resources, the densest population and the most important cities. The region is also the manufacturing area of Canada. The great disadvantage of the St. Lawrence, however, is that it does not flow directly east, but to the north-east, and is thus ice-blocked or dangerous for five months of the year. The dangers in autumn cause

the insurance rates to run up, and this favours New York as against Montreal as a port of export.

The Region of the Great Lakes.—A recent monograph of the United States Geological Survey (vol. liii.), entitled "The Pleistocene of Indiana and Michigan and the history of the Great Lakes," by Messrs. Leverett and Taylor, may be mentioned here as containing some material of geographical value. The subject is treated from a purely geological point of view, without reference to the geographical significance at the present time of the effects of the Pleistocene conditions described, but the maps of the different glacial lakes and their connecting river channels throw much light on the causation of the existing conditions. For example, at the stage of the Nipissing Great Lakes, the stage which immediately followed the disappearance of the ice, Georgian Bay communicated *via* the present French river, Lake Nipissing and the Ottawa river with the St. Lawrence, or rather with the Champlain Sea, which then covered its estuary. This line marks of course an important line of communication at the present day. In the earlier Algonquin stage, that branch of the great lake which now forms Lake Michigan drained south-west past the present site of Chicago into the Illinois river. At the same time a channel carried the waters of the larger lake which covered the present site of Lake Ontario *via* the Mohawk valley into the present Hudson-Champlain valley, which was then a marine estuary forming a continuation of the sea which covered the St. Lawrence. In general the maps show how the effects of the ice led to the origin of those "through" valleys which have played so important a part in the commercial development of the north-eastern United States and south-eastern Canada.

Polar.

Mr. Knud Rasmussen's Expedition to Peary Land.—It is announced that the Danish explorer, Mr. Knud Rasmussen, is organising a new expedition to Peary Land, in the extreme north of Greenland. Mr. Rasmussen is to sail from Copenhagen in the beginning of April, in his schooner the *Cap York*. He expects to be stopped by the winter ice of the west coast of Greenland, and will then leave his ship and push on, with sledges drawn by dogs, to the permanent station which he maintains at Thule, on the north-west coast of Greenland. Here he hopes to arrive in the middle of May, and before the end of that month will start for Peary Land, distant about five hundred miles across the inland ice. He will be accompanied on this journey by his assistant, Mr. Peter Freuchen, and two Eskimo followers. The middle of June should see him on the north coast of Greenland, and he then proposes to devote six or seven weeks to the exploration of the isthmus connecting Peary Land with the main body of Greenland. According to programme, the return journey over the inland ice-cap will be accomplished during August, and on his arrival back at Thule at the beginning of September he hopes to find his schooner awaiting him, ready for the voyage home to Denmark. The total distance to be covered between May and

September, partly over the inland ice, and partly in the northern coast region, is about two thousand miles.

GENERAL.

Royal Geographical Society's Awards.—It is announced that the Patron's Gold Medal of the Royal Geographical Society has this year been bestowed on Captain F. M. Bailey, son of the late Colonel Bailey, formerly secretary of this Society, for his explorations in the region traversed by the Brahmaputra river. Captain Bailey is to be cordially congratulated on his well deserved honour: it will be remembered that he has already received the Gill Memorial from the Royal Geographical Society. The Founder's Medal of the Society is bestowed upon Lieutenant Colonel P. H. Fawcett, for his work in tropical South America, both as a Commissioner in the boundary settlement between Bolivia, Peru, and Brazil, and in an independent expedition. The Murchison grant goes to Lieutenant-Colonel Whitlock for his work in delimiting the frontier between Nigeria and the Cameroons, the Back bequest to Mr. Frank Wild, Sir Ernest Shackleton's second in command, the Cuthbert Peak grant to Mr. F. Kingdon Ward for his travels in the frontier region between China and Burma, and the Gill Memorial to Lieutenant-Colonel E. H. Jack for his labours in connection with fixing the frontier between Uganda and the Congo State.

The Origin of Ground-Ice.—In a paper on Ice and Hydraulic Installations in the *Revue Générale des Sciences* for January 30, Mr. J. Vichniak summarises some recent work on what is known in text-books of physical geography as "ground-ice," though the term appears to be erroneously applied. The appearance of this form of ice is of frequent occurrence in countries with a severe winter climate, in streams too swift to freeze over completely, and therefore in the type most likely to be employed as sources of water power. The ground-ice phenomenon consists in the appearance near the surface of streams, sometimes with great suddenness, of masses of a peculiarly spongy and porous kind of ice, quite different in aspect from the ordinary solid compact ice which forms on the surface. The name ground-ice is used in text-books because the ice has been supposed to form at the bottom, round stones and boulders in the bed, and then after a time to rise to the surface, carrying with it masses of sand and alluvium. Except ground-ice no scientific term has been applied to this form of ice, but in almost all countries in which it occurs local names are found. Thus "sherbet" is used by the workmen in the Durance valley in France, "ice-jam" in America, a word signifying candle-grease in Russian, while forms like ice-in-jelly, ice-soup, ice pulp, have all been suggested. All the names refer to the peculiar fluidity of the ice-masses, which appear like half-melted snow. A Russian engineer, M. Loktine, who has made some elaborate experiments on the Neva, comes to the conclusion that the appearance is due to the exposure of rapidly-flowing water to cold air. The mingling of the ice-masses with impurities, grains of sand, etc., he finds to be due, not, as was supposed, to the origin of the ice at the

bottom of the streams, but to the mingling of two currents of water, the one containing suspended alluvial matter, and the other the "ice-sherbet." When the two intermingle the ice crystals congeal round the grains of sand, and either raise them to the surface or hold them in suspension.

According to another view, due to a Swiss engineer, Dr. Luscher, the formation of the ice-masses is due to the contact of two layers of water, one cold, containing ice-crystals, and the other warm. If this view be correct then the method, often employed in hydraulic installations, of getting rid of the mass of floating ice by the application of heat is dangerous, as it only leads to a further production of ice-masses. Meantime a decision between the two views seems impossible, but the importance of the subject for hydraulic engineers makes it certain that further investigations will be carried out. The remainder of the paper gives an interesting account of the effect of the ice-masses on hydraulic installations in various parts of the world, and the means adopted to deal with them. None of the measures yet taken seem to be particularly effective.

EDUCATIONAL.

Dr. J. D. Falconer, Lecturer in Geography in Glasgow University, and Swiney Lecturer in Geology at the British Museum, has been selected by the Secretary of State for the Colonies for the post of temporary assistant district officer in the northern provinces of Nigeria. Dr. Falconer has been granted leave of absence from the University from the end of the present term.

The Oxford School of Geography. We are informed that the General Board of the Faculties of the University of Oxford will elect a Reader in Geography in the course of the Easter or Trinity Term, 1916, who will be appointed by the Committee for Geography Director of the School of Geography. The appointment will be for five years from October 10, 1916, and the holder of the post will be eligible for re-election. His stipend as Reader will be £300 per annum, and as Director not less than £200 a year. Candidates are requested to send in their applications, with such evidence of their qualifications as they may desire to submit, to the Assistant Registrar, University Registry, Oxford, so as to reach him not later than Wednesday, May 31. Six copies of the letter of application, and of any testimonials submitted, should be sent, and at least one copy of any published work to which it is desired to call the attention of the Board.

NEW BOOKS.

EUROPE.

Poland: A Study in National Idealism. By Monica Gardner. London: Burns and Oates, 1915. *Price 3s. 6d. net.*

The book is chiefly devoted to a discussion of Polish literature, but the first chapter, entitled "The Last Hundred Years," gives a stirring account of the tragic

history of Poland, and tells once again the dreadful tale of Prussia's treatment of the Poles. A useful table at the end gives a number of dates of importance in the history of Poland.

The Balkans: A History of Bulgaria, Serbia, Greece, Rumania, Turkey. By Nevill Forbes, Arnold J. Toynbee, D. Mitrany, D. G. Hogarth. Oxford: At the Clarendon Press, 1915. *Price* 5*s.*

This little book consists of a series of essays rather than of a history in the strict sense, for the four authors deal with the countries separately, Mr. Nevill Forbes being responsible for both Bulgaria and Serbia, and the preface informs us that they have had no opportunity for any interchange of views. The result is some difference in style and mode of treatment and a certain amount of repetition, inevitable when countries whose past has been closely interwoven are discussed in separate sections. Even at the present day, indeed, the destinies of the five countries are closely connected, and while all four authors deal, to a greater or less extent, with the Balkan wars, none tells the whole story, a somewhat unfortunate fact in view of the important bearing of those wars upon present conditions.

The chapters of most directly geographical interest are perhaps those in Mr. Mitrany's essay which deal with the modern and contemporary period in Rumania, and Mr. Hogarth's discussion of the probable future of Turkey. The first gives a very instructive picture both of existing conditions within Rumania, and of those prevailing among the Rumanians in Bessarabia and in Hungary. Mr. Hogarth discusses in an extremely interesting fashion the probable fate of the Turkish empire, and of its different elements, in the event of an Allied victory. If Constantinople were lost to the Turks, he believes that the Arab-speaking parts of the empire would in all likelihood break away, carrying the Holy Cities with them, and this would involve European tutelage of parts of the Arab-speaking area, which he believes would be a difficult and thankless task. So far as the Moslem inhabitants of Asia Minor go, he believes that these agricultural peasants would accept philosophically any domination which might be imposed upon them, provided their fields and their village life were left to them. But the Christian minority presents to his mind much greater difficulties, and this whether Greeks or Armenians are considered. The constitution of an autonomous Armenia would be a complicated matter, on account of the scattered Armenian population and the fact that the Armenians are essentially townsmen. The Greeks of the interior would perhaps submit passively to a lord of the interior, but those who dwell on the western and north-western coast-lands are strongly attracted to Greece proper, and would be difficult to deal with. On the other hand, the union of any part of the littoral, or even of the town of Smyrna, with Greece would involve that power in all sorts of troubles and risks. The popular shibboleth of "the principle of nationality," invoked elsewhere in the book, is evidently of no great value in Asia Minor. Mr. Hogarth has himself no solution to offer of the manifold problems which the collapse of the Turkish empire would bring to light, but his indication of the nature of these forms a striking close to an instructive book, which the geographer cannot afford to neglect, though it is not primarily written for him.

My Slav Friends. By Rothay Reynolds. London: Mills and Boon, 1916. *Price* 10*s.* 6*d. net.*

The author of this most readable and well-written book went to live in Russia in 1904, and has evidently made a profound study of its people. He points out the early connection of England with Russia, but says that, although Gytha,

daughter of King Harold, who was slain at Hastings, married the Russian Prince of Tchernigov, "Richard Chancellor discovered Russia in the year 1553," for it was the result of his voyage to Moscow which brought England and Russia together commercially. The English made excellent cloth, the Russians produced excellent tallow. The subjects of Ivan the Terrible wanted the one, and the subjects of Bloody Mary wanted the other. Germans, Englishmen, and Scotsmen had a special suburb of Moscow allotted to them, and occasionally "Russian bridegrooms went to the altar with British brides." The mother of Peter the Great was brought up in a Scottish household in this suburb.

At the present time, there is not a notable play or novel produced in London which is not acted or read in Russia. The Russians know our literature and history so thoroughly that British lecturers in Russia meet with a most critical audience. The author warns us against believing all we read about Russia. "Tell your countrymen," said the statesman Count Witte to him, "to disbelieve 90 per cent. of the news they receive from Russia."

Mr. Reynolds eulogises the Russian peasant, and says he may be ignorant and superstitious, but his history shows not merely that he has a good heart but also that he is capable of the most exalted heroism—as the present war has abundantly proved. "The abolition of serfdom has given the lower classes of Russia the dignity which freedom alone can bestow, and it has deprived the upper classes of a power which tended to debase them." The author does not, however, concur with some writers in thinking that the Russians are "as a people peculiarly endowed with the quality of pity." He tells us how changed Russian women have become in recent times. "The Russian woman of the present, what a marvellous person she is! She may be a practised woman of the world, she may know all there is to be known about microbes, she may be a clerk in a bank, a novelist, a dentist. And when she attends an All-Russian Women's Congress, one trembles at the thought of the lengths to which she may not go. She has risen in such an assembly and denounced marriage as an institution no longer fitted to modern needs, and her sentiments have been applauded. Happily, as in our own country, most Russian women do not hold that the world's change and Progress are synonymous."

The author contrasts the enthusiastic welcome given by Russia to Edward VII. in 1907 with the cold one accorded to Kaiser Wilhelm on his visit later. "Our love of liberty was the charm that conquered the Russians' hearts." At the same time, Russians cannot understand many British conventions, such as that a politician's or a writer's private life must be unblemished to win for him public approval. "That the career of a statesman should be ruined by an intrigue with a married woman seems to them ludicrous." No book recently issued on Russia gives us a better idea of this extraordinary and most interesting empire, with its people so simple and so lovable, and yet so very different from ours.

ASIA.

Et Primitivt Folk: De Mongolske Ren-Nomader. By Yrjan Olsen. Kristiana: J. W. Cappelens Forlag, 1915.

This book gives some account of observations made upon the Reindeer Nomads of the Upper Yenisei region, during the course of the Norwegian Siberia expedition in 1914. It is illustrated by a number of reproductions of the photographs taken by the expedition, and also by a sketch-map of the region inhabited by the nomads. The customs and habits of the people, their mode of life, language, religion, morals and migrations are all discussed, the reindeer naturally receiving a large amount of attention, both in the text and in the illustrations. Some of the latter

are very striking. The author in the course of his descriptions dwells on the resemblances which these people show to the Lapps of Scandinavia, and his account of them will be found very interesting.

An Irishwoman in China. By Mrs. de Burgh Daly. London: T. Werner Laurie, Ltd., 1916. *Price* 10*s.* 6*d. net.*

Mrs. Daly modestly describes her book as "a simple record of the life of ordinary European residents in China, who were interested in the people amongst whom they lived, and very friendly with them." But the reader does not require to go far to see that Mrs. Daly's outlook on life during the quarter century or so which she spent amongst the Chinese is that of a cultured woman of the world, and also that she writes in a kindly, humorous spirit which helps to preserve a sense of proportion, and also serves to invest her record with a living interest which is sometimes lacking in more ambitious efforts. By dwelling largely on the personal element in her experiences she has been able to lend fresh interest to a well-worn theme, and to give to the world a very charming readable book of China, which is, perhaps, also something of an achievement! Of travel, in the real sense of the word, there is little or none. The author went out to China in 1888 to take charge of a small hospital for Chinese women, and soon after she became the wife of Dr. de Burgh Daly, then the doctor at the port of Ningpo. The latter gave up his practice at Ningpo, and removed to Newchwang, in Manchuria, and most of Mrs. Daly's experiences relate to the far north of China where she and her husband lived through some stirring and eventful times. First, there was the war between China and Japan, when the Japanese invaded Manchuria in force, and made short work of the badly-equipped army of the Chinese, although the latter often fought bravely. Then came the "Boxer" outbreak of 1900, followed by the landing of the allied forces of the European powers and Japan. Before things had had time to settle down, the Russo-Japanese war broke out, and Manchuria was again the scene of much of the fighting. Six or seven years later, China was in revolution, and, between whiles, there were the outbreaks of bubonic plague which called forth the best efforts of European doctors and missionaries to stay the progress of the disease. In all of these events Mrs. Daly's husband appears to have played his part of good Samaritan, and worked hand in hand with the missionaries in organising hospitals, and doing what was possible to alleviate the sufferings of the sick and the wounded, and the refugees, who, for one cause or another, were always pouring into Newchwang, and straining the resources of the small band of European doctors.

Mrs. Daly's remarks on the conditions amongst Europeans at the ports, their social relations, the virtues and peculiarities of native servants, etc., are witty and amusing, and, moreover, are very true to life. She finds Chinese and Irish servants very much alike, in that both are good-natured and obliging, but lacking in the solid virtues of the English domestic. Her conclusion is, after living amongst the Chinese for a quarter of a century, "that a people who are possessed of so much ability and so many good qualities are bound in time to arrive at real greatness; not merely the greatness of bulk and numbers, but of equitable government and real patriotism."

We may mention that Mrs. Daly, by a pardonable omission, has failed to make sure of her facts when she says, on p. 245, that the Great Wall of China "stretches for thousands of miles." It is a marvellous work, and is still to be seen winding over mountain and valley, though it dates from about the time of the walls of Hadrian and Antoninus in our own country; but the length of it, in a straight line, is about 1250 miles.

Perfumes of Araby: Silhouettes of Al Yemen. By Harold Jacob. London: Martin Secker, 1915. *Price 7s. 6d.*

This volume has an interesting foreword by Lord Lamington in which Aden is compared, as to situation and function, to Gibraltar. It is explained that Colonel Jacob, as a political officer, has spent some years in the Hinterland of the former town, where he has been a sympathetic observer of the people. The book itself consists of a series of sketches of Arab life and customs, special stress being laid upon characteristic phrases and proverbs.

AFRICA.

The Civilisation of the Ancient Egyptians. By A. Bothwell Gosse. London and Edinburgh: T. C. and E. C. Jack, 1915. *Price 5s. net.*

This, which is one of the "Through the Eye" Series, is a very finely illustrated volume, describing the life of the Ancient Egyptians, under such headings as Education, Professions, and Occupations, Architecture, Science, and so forth. The geographer will regret that no definite attempt is made to set forth the physical surroundings of the people, or to suggest the relation between the material basis of their civilisation, and the conditions under which their life was passed. But no one can fail to enjoy the charming photographs, and the clear descriptions of them which the text affords. The book would form an admirable present for an intelligent boy or girl.

AMERICA.

Stanford's Compendium of Geography and Travel (New Issue): *North America*, Vol. I., Canada and Newfoundland. Edited by Henry M. Ami, M.A., D.Sc., F.G.S., F.R.G.S., F.R.S.C. Maps and Illustrations. London: Edward Stanford, Ltd., 1915. *Price 15s. net.*

So great has been the progress made within the last twenty years in every line of geographical investigation, that the need for bringing our knowledge of countries up to date hardly requires to be argued. With regard to Canada, which is undergoing hourly development, this necessity has been met by the above new issue of Volume I. in *Stanford's Compendium*. To Dr. Ami has been entrusted the work of practically rewriting the geography of Canada and Newfoundland in the light of new knowledge, and most worthily has he performed his heavy task of assimilating enormous masses of economic, social, educational, and other material, and presenting them to us in enticing yet accurate array.

Since the first edition of the volume was issued some of the main changes in the geography of our American Dominions may be indicated. Canada now consists of nine constituted provinces, the Yukon Territory and the North-West Territories, in the last of which is included the Arctic Archipelago. In 1903 the boundaries of British Columbia and of the Yukon Territory were changed, in accordance with the finding of the Canada-Alaska award of London; in 1905, Alberta and Saskatchewan were erected into provinces, Assiniboia and Athabasca disappearing from the map; in 1912, Quebec, Ontario and Manitoba were greatly extended in area. The "French Shore" question (Newfoundland) has been settled amicably, and this should help to cement the good relations between France and Great Britain. The extent of unexplored areas is rapidly diminishing, and all branches of geographic knowledge are being actively pursued with the help, and under the supervision, of the Canadian Government.

Some examples may be given of the marvellous progress made in certain direc-

tions by Canada as a whole. Between 1871 and 1911 the population was doubled, and in March 1914 it was calculated to be 8,075,000. In 1911 the total population of French origin was 2,054,890. Against 66 miles of railway in 1850, the Dominion in 1904 had 19,431 miles, and in 1915 more than 43,000 miles in operation. As showing the development of the Colony's resources, it is to be noted that all necessary articles of food, except tea, coffee, and sugar, are raised, while manufactures of cotton and woollen goods, boots, shoes, soap, paper, sugar, beer, whisky, agricultural implements, furniture, edge tools, and many other articles are carried on. For 1912-13 the value of the chief exports (consisting of the produce of mines, fisheries, forests, animals, agriculture and manufactures) reached in round figures 356 million dollars, an increase of almost 50 per cent. on the figures for 1908-09. For the year 1914 the total trade of Canada was valued at practically 1130 million dollars; of this sum imports accounted for 650 million dollars, the exports amounting to 479 million dollars. The export of agricultural products for year ended 31st March 1913 was valued at 150 million dollars, wheat and flour of wheat accounting for more than two-thirds of that sum. In order of importance (judging from the latest figures quoted) the mineral exports were silver, gold, copper, coal, nickel, asbestos; the export of iron, mica, corundum, petroleum, and gypsum is of much less account. Ontario now ranks *third* among silver-producing countries of the world.

As to the individual provinces and Newfoundland, it need only be said that substantial progress is being made in all directions, notably in education, Canada's young inhabitants being able to procure a sound training from the elementary school until graduation at a university or college.

The volume, which has numerous maps, an exhaustive bibliography, and an ample index, will be invaluable, not only to students of geography but to the general reader. Canada for centuries has been a land of romantic endeavour and high achievement, and although the early picturesque days of the Colony may be past, Dr. Ami's pages prove that the future holds out to the settlers in this "few acres of snow" more alluring and solid prospects than were presented to the eyes of the pioneers.

AUSTRALASIA.

The Colonisation of Australia (1829-42). By Richard Charles Mills, LL.M. (Melbourne), D.Sc. Economics (London). With an Introduction by Graham Wallas, M.A. Pp. xx + 363. London: Sidgwick and Jackson, Ltd., 1915. *Price* 10*s.* 6*d. net.*

This work is a thesis for the degree of Doctor of Science (Economics) in the University of London, and speaks well for the excellence and thoroughness of the work promoted by that institution through the London School of Economics. The sub-title of the work, "The Wakefield Experiment in Empire Building," gives, perhaps, a more precise idea of its scope than the broader general title. For the work is almost entirely devoted to an exposition of, and comments upon, the ideas and activities of the celebrated Edward Gibbon Wakefield in connection with colonisation, and includes a chapter upon the Durham Report of 1838 with regard to the situation of Upper and Lower Canada, a report in which the influence of Wakefield was marked in certain important particulars. The first year of the period to which the work is expressly said to refer was that in which Wakefield first gave public expression to his ideas on the subject of colonisation. This was done in the form of a number of letters published in the *Morning Chronicle* in the months of August and October of that year, and republished in book form

before the end of the year, though without the name of Wakefield being attached to it. The book was merely given forth as edited by Robert Gouger. This work, it may be mentioned parenthetically, was written while the author was serving a well-merited term of imprisonment in Newgate. But it marked an epoch not only in his own life but in that of the history of colonisation. Wakefield's ideas seem to have been largely due to his study of the failure of the Swan River Colony two or three years previously. That failure he regarded as due to the dispersal of the settlers over wide areas owing to the facility of obtaining large grants of land, no piece of which could be adequately developed in consequence of the lack of concentrated labour which was thus brought about. He made it accordingly a fundamental principle in the schemes of colonisation which he advocated that land should not be granted upon too easy terms; that a "sufficient price" should be charged for it to make it necessary for settlers who had not the means to buy land at the price fixed to work as labourers for a certain term of years before they should be in a position to purchase land from their earnings, and that the proceeds of such sales should be largely, if not wholly, devoted to the promotion of emigration from the United Kingdom. It cannot be considered that these ideas were ever thoroughly carried out in the settlement of any Australasian colonies; but Wakefield's persistent influence had the effect of greatly stimulating the interest of public men in England in the subject of colonisation, and thus securing better colonial legislation than was likely to have been obtained otherwise. The Colonisation Act, in which the influence of Wakefield was most marked, was that of 1834, under which the settlement of South Australia was subsequently made in 1837. But the provisions of the Act did not satisfy Wakefield himself. The lowest price at which the commissioners appointed to carry out the Act were authorised to sell land was 12s. an acre, a price which was ultimately adopted, but which was not deemed to be a "sufficient price" by Wakefield, who considered that that was in itself enough to vitiate the experiment as a trial of his theory, and attributed to that low price the fact that settlers took up more land than they could use (p. 257). Mr. Mills adds that "If the Wakefield theory is taken to mean the sale instead of the free granting of land, and the use of the proceeds in selected emigration, it was in this case conspicuously successful," and in the tenth chapter p. 321 he points out that to this extent also the principle of the Wakefield system was adopted in an Act relating to the Australasian colonies generally, passed in the year which marked the end of the period to which he referred, viz., the Australasian Waste Lands Act of 1842, which regulated the conditions upon which henceforth the waste lands of Australia were to be disposed of. In the same year another Act was passed giving to the colonists of New South Wales some measure of self-government, and Professor Wallas in his Introduction insists that the main practical outcome of Wakefield's activities was the ultimate establishment of responsible government in the colonies. This, however, can only be looked upon as an indirect result of his efforts, though it is worth noting that as early as 1829 in a *Letter from Sydney* the idea of a colonial Assembly in which the colonies should frame their own laws under the eye of a Viceroy incapable of wrong was already favoured by Wakefield (p. 265). It is rather noteworthy that Wakefield never seems to have conceived the idea of carrying out a system of settlement which has since proved so useful, not merely in the British colonies, but in the United States, according to which free land grants of moderate extent are made on the condition of the lands being more or less developed within a term of years. The author appears to have consulted all available authorities with regard to the subject of which he treats, and to these in every case he gives precise reference, and nearly every aspect of his subject is dealt with. Yet there is one point to which we should have liked

to see a reference, viz., the fact that the colony in Australia in the establishment of which the influence of Wakefield was most decisive was the first of all the Australasian colonies in which the cultivation of wheat for export came to be a leading feature of the trade, notwithstanding the fact that the yield of wheat in South Australia is abnormally low. One would like to know whether this fact could be shown to have had a direct connection with the conditions in which that settlement was made.

BOOKS RECEIVED.

The Civilisation of Babylonia and Assyria; its Remains, Language, History, Religion, Commerce, Law, Art, and Literature. By MORRIS JASTROW, Jr., Ph.D., LL.D. With Map and 164 Illustrations. Imp. 8vo. Pp. xxvi+515. *Price* 25*s. net.* Philadelphia: J. B. Lippincott Co., 1915.

Vive la France. By E. ALEXANDER POWELL. Illustrated. Demy 8vo. Pp. xv+253. *Price* 3*s.* 6*d. net.* London: William Heinemann, 1916.

Leaves from a Field Note-Book. By J. H. MORGAN. Cr. 8vo. Pp. xii+296. *Price* 5*s. net.* London: Macmillan and Co., Limited, 1916.

The German African Empire. By ALBERT F. CALVERT, F.C.S., etc. 48 Plates. Crown 8vo. Pp. xxxiv+335. London: T. Werner Laurie, Ltd., 1916.

With Scott: The Silver Lining. By GRIFFITH TAYLOR, D.Sc., etc. Small Royal 8vo. With Facsimiles, Maps, and nearly 200 Illustrations. Pp. xvi+464. *Price* 18*s. net.* London: Smith, Elder and Co., 1916.

The Luck of Thirteen: Wanderings and Flight through Montenegro and Serbia. By Mr. and Mrs. JAN GORDON. With 4 coloured Plates, 16 pages of half-tone Illustrations, and a Map. Large Post 8vo. Pp. viii+378. *Price* 7*s.* 6*d. net.* London: Smith, Elder and Co., 1916.

A New Account of East India and Persia: Being Nine Years' Travels, 1672-1681. By JOHN FRYER. Edited with Notes and an Introduction by WILLIAM CROOKE, B.A. Vol. iii. Demy 8vo. Pp. x+271. London: Printed for the Hakluyt Society, 1915.

Descripción Geográfica de la Real Audiencia de Quito que escribió Don Dionisio de Alsedo y Herrera. Imp. 8vo. Pp. xxxvi+102. Madrid: The Hispanic Society of America, 1915.

The History of Kathiawad from the Earliest Times. By Captain H. WILBERFORCE-BELL, lately Political Agent, Sorath. With a Preface by the Hon. Mr. C. H. A. HILL, C.S.I., C.I.E., I.C.S. With Illustrations and a Map. Demy 8vo. Pp. xxii+313. *Price* 12*s.* 6*d. net.* London: William Heinemann, 1916.

Report on the Administration of Coorg, 1914-1915. Mercara, 1915.

Report on the Administration of Delhi Province, 1914-1915. Delhi, 1915.

Catalogue of the War Office Library. Fourth Annual Supplement. London, 1916.

Diplomatic and Consular Reports.—Patras (5556); Yokohama (5545); Finland (5546); Costa Rica (5553); Pakhoi (5554); Siam (5557).

Colonial Reports (Annual).—Mauritius (875); Leeward Islands (876); Trinidad and Tobago (877).

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

NOTES ON THE FORMER COURSES OF THE RIVER DEVON.[1]

A suggested Evolution for Part of the River System of Fife and Kinross.

By J. E. Wynfield Rhodes, B.Sc., M.I.M.E.

(*With Diagrams and Sketch-Maps.*)

In the *Story of the Forth*, by H. M. Cadell, it is suggested that the water from Glen Devon originally reached the sea *via* the Leven or Eden valleys, and that this original stream was beheaded at the Crook of Devon by a subsequent river working back along the Ochil Fault. The author has given this suggestion some detailed attention, and has endeavoured to work out the evolution not only of the present Devon, but also of the other rivers of West Fife and Kinross.

The district concerned in this paper stretches from the Ben Chonzie group of the Grampians to the Firth of Forth, and its river system is very mature. The area consists essentially of a great lowland composed of sedimentary rocks broken up by ridges of igneous rocks. The patches of high ground are almost always determined by the outcrops of the harder rocks, and thus tend to produce isolated hills like the Hill of Beath, or ridges like Benarty and the Ochils, according to the sizes and shapes of the masses of hard rocks. These hills evidently owe their existence to the hardness of their constituents, and a casual map reader might suppose that the rivers of to-day were the consequences of this topography, and not, as is really the case, the topography the result of the evolution of the rivers. Further, there are various depressions or wind gaps which must have been eroded and are not occupied by streams at the present day.

For example, the base of the Carboniferous to the north is marked

[1] A paper read before the Edinburgh Geological Society on Jan. 19, 1916, and published here by kind permission of the Council of that Society.

by a great series of intrusions of dolerite forming the Lomond, Benarty, and Cleish hill ranges. In the case of each of these the lowest sill lies on nearly the same stratigraphical horizon, but descending slowly as we pass from north to south. This lowest sill is probably the same in each case. On the other side of the coal basin a similar sill rises at the same horizon to form the Cullalo Hills. The Cleish-Benarty-Lomond sill is cut right through in two places, but in neither case is the gap traversed by any stream at the present day. These gaps will be referred to as the Blairadam and Ballingry wind gaps. The sill is also trenched by the present valley of the Leven, but in this case the gap is much narrower and less notable. The Blairadam gap lies between the Benarty and Cleish Hills, and is traversed obliquely by a fault which throws down the dolerite to the south-west. As a result, whilst Benarty rises to 1072 feet in half a mile to the east of the gap, the Cleish Hills take nearly one and a half miles to rise to 933 feet to the west of it. The water from Loch Leven, instead of escaping by one of these obvious routes, has, as already mentioned, cut for itself a narrow defile in the dolerite at Auchmuir Bridge. Seawards from these wind gaps are the deep and wide valleys of the River Ore and the Lochty Burn, whose streams are obviously too small for them, and as if to point out unmistakably the true explanation, the valley of the Lochty Burn points straight at the Ballingry gap and across Loch Leven at the valley of the South Queich.

It is evident, therefore, that there have been profound changes in the drainage of this area, but by careful observation of its present topography we may trace out the original lines of drainage. We shall see that the deeper valleys and depressions give us the key to the older river systems of the land.

In the first place let us note that the bulk of the valleys point east or east-south-east independently of the grain of the country. In particular two lines of depression have been traced across the area in an east-south-east direction as follows:—

A. From Glen Lednock, beyond Comrie, past Muthill, through Glen Eagles and Glen Devon to the Crook of Devon, thence by the Gairney Water to Blairadam wind gap, and thence across the Ore valley to the sea, crossing the Raith Hills near Carden Tower. The cols between the valleys of this series are as follows:—

Glen Lednock, 1557 feet.
Glen Eagles (head), 881 feet.
Crook of Devon, less than 500 feet.
Blairadam, about 420 feet.
Carden Tower, about 400 feet.

B. From the Ochils to East Wemyss *via* the South Queich valley, the Plain of Kinross, the Ballingry wind gap, the valley of the Lochty Burn to Thornton, and thence over a low col into a small valley leading to Wemyss. The altitudes are as follows:—

Plain of Kinross, 351 feet.
Ballingry Gap, about 400 feet.

Profiles along these lines have been plotted to scale (Fig. 1).

The consequent drainage of this part of the country was probably east-south-east. Of this we have two kinds of evidence. In the first place the chief rivers flow in an eastward direction, and several lines of depression which may well indicate former streams also show this trend. Secondly, the general uplift of the British Isles seems to have resulted in a tilt to the east or south-east in the other parts of the eastern seaboard which have been studied. It is, therefore, reasonable to suppose that the two lines of depression we have just traced were once river valleys, and we shall refer to the streams that occupied them as A and B. They represent a portion of the original consequent drainage of the country.

It should be noted that the regions traversed by these streams pre-

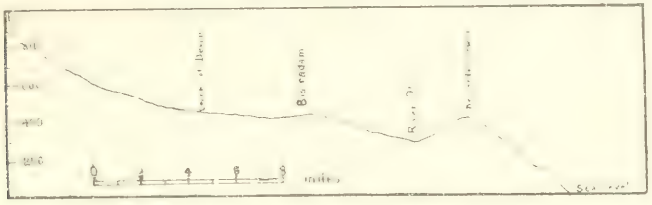


FIG. 1.

sented a considerable diversity of geological features which would largely determine the subsequent drainage, especially as the consequent streams A and B were nearly perpendicular to the dominant west-north-west strike of the older rocks. The most noteworthy of these geological features would be (1) The broad band of soft Upper Old Red Sandstone now marked by the straths of Earn and Allan: (2) the hard igneous rocks of the Lower Old Red now forming the Ochils, bounded by faults on the southern side: (3) the soft Upper Old Red Sandstones now occupying the Eden valley and the Plain of Kinross: (4) the hard igneous rocks intruded at the base of the Carboniferous, which, owing to the syncline of the coal basin, form both its northern and southern lips: (5) the coal measures now producing the Cowdenbeath and district and Kinglassie coalfields.

In consequence of these structural peculiarities we should expect to

find in a mature drainage of the area the following geographical features:—(1) Broad river valleys along the strike of the Upper Old Red Sandstone; (2) a range of hills marking the outcrop of the hard igneous rocks of the Lower Old Red; (3) a more complicated topography in the Carboniferous area, since not only are the tectonic features here more diverse, but the presence of volcanic necks, lava flows, and sills would also be evidenced in the form of isolated hills and ridges.

At the present day we note (1) that the valleys of the Earn and Eden are strike valleys in the Upper Old Red; (2) the Ochils mark the outcrop of the hard Lower Old Red, the position of the fault on the south side being indicated by the lower course of the Devon; (3) the topography of the Carboniferous area is complicated, but shows up remarkably well both the tectonic features and the presence of the volcanic necks and whinstone sills. Thus we have the volcanic necks of the Hill of Beath, Saline Hill, Knock Hill, Carden Wood, Lochore, and others near the coast, and the sills forming the Cleish Hills,

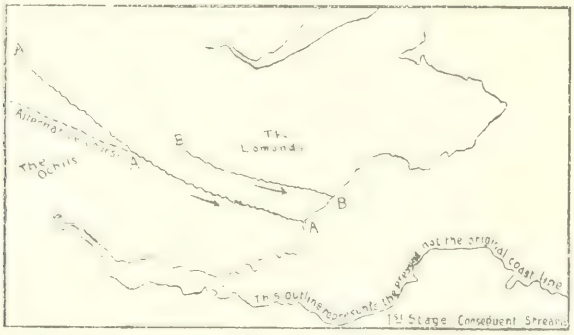


Fig. 2.

Benarty, the Lomonds, the Beath Hills, and the Cullalo and Raith Hills, to give only a few examples. Also Loch Fitty lies along a fault, and the Ore valley, west of Thornton, follows a syncline.

It is our object to trace, as far as possible, the steps by which the present drainage was evolved from the original consequent river system. We shall divide the process into five stages as follows:—

First Stage. Consequent drainage by streams A and B as follows. Stream A, course traceable in a general east-south-east direction by the following valleys and depressions, viz.:—Glen Lednock, Glen Eagles, Glen Devon, valley of the Gairney Water, Blairadam wind gap, upper Ore valley, and the valley of the Chapel Burn. Stream B, also flowing east-south-east in a course now indicated by the North Queich valley, Loch Leven, Ballingry wind gap, valley of the Lochty Burn, and the lower Ore valley. It probably entered the sea at East Wemyss (Fig. 2).

Second Stage. A subsequent stream from B cutting along the strike of the carboniferous rocks beheads A near Cardenden and the wide valley of the Ore is developed. Stream A would be delayed by the hard igneous barrier now forming the Raith Hills, whereas stream B

encounters between Benarty and the sea nothing harder than the Millstone Grit. Stream A is also beheaded near Muthill by a subsequent

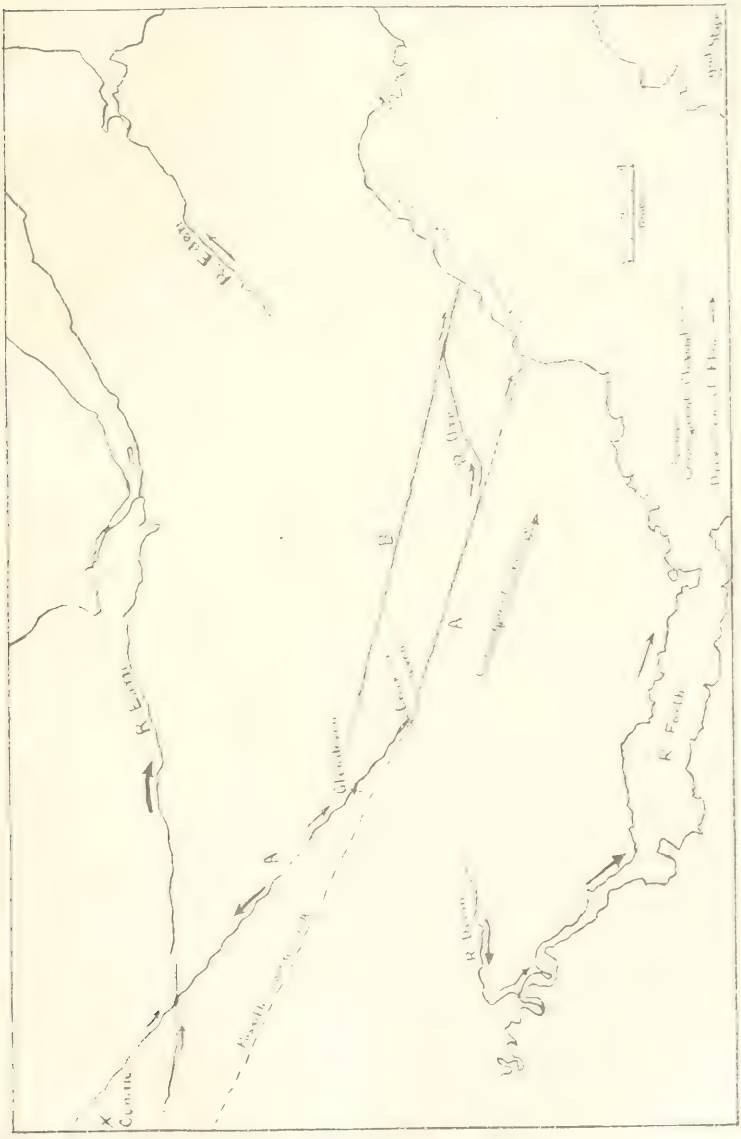


Fig. 3.

stream (the Earn) working along the soft rocks of the Upper Old Red. Glen Eagles then becomes an obsequent valley (Fig. 3).

Third Stage. A subsequent stream working along the Ochil fault beheads stream A at the Crook of Devon, and the Devon is produced (Fig. 4).

Fourth Stage. The subsequent stream Eden, working along the outcrop of the Upper Old Red beheads stream B north of Ballingry and excavates the wide Plain of Kinross. The Gairney Water is formed by the beheading of stream A at Blairadam by a tributary of the Eden (Fig. 5).

Fifth Stage (Glacial and post-glacial period). Loch Leven is produced by the damming of the Eden at Mawcarse. The loch overflows at Auchmuir Bridge, where the stream cuts a channel through the dolerite. The Ore valley near Thornton also seems to have been

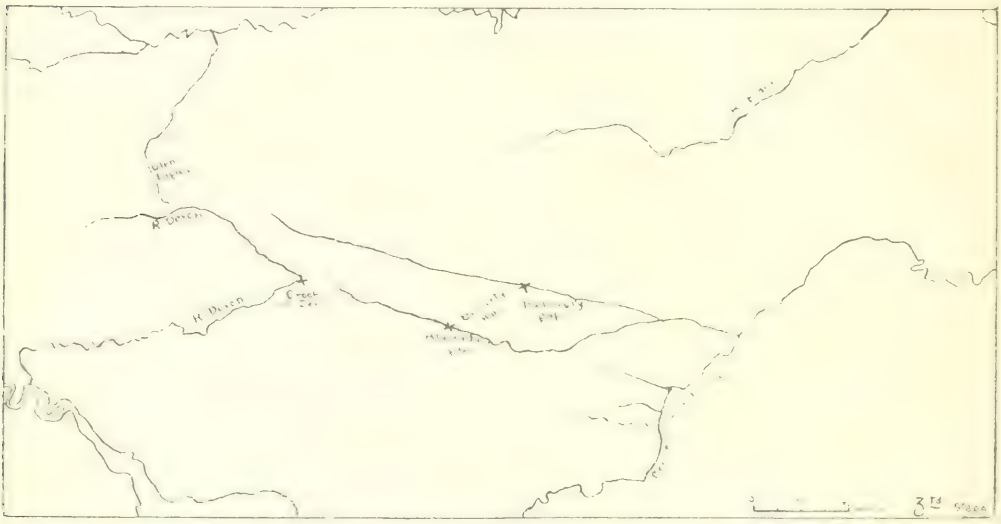


FIG. 4.

dammed either by ice or drift, for the Ore now turns northward here to join the Leven valley (Fig. 6).

Diagram by the author suggested view.

First Stage. The evidence for the existence of the consequent streams A and B has already been given.

Second Stage. The fall from Blairadam to Carden Tower is very slight, although the distance is 6½ miles, whilst from Carden Tower to the sea there is a fall of 350 feet in 3½ miles. This looks as if stream A was beheaded between Blairadam and Carden Tower at a very early date. After this diversion the lower part of stream A would languish from lack of water, and as a result further alterations would occur in the drainage of the North Hills, making the original stream more difficult to trace.

The depth of the Earn valley below the Glen Eagles col makes it probable that this is a very old valley, and in that case the beheading of stream A near Muthill may be placed in the second stage. The Earn would be able to capture the headwaters of stream A, as it would be working in soft Upper Old Red rocks, whilst stream A was with difficulty deepening its channel in the hard andesites of the Ochils.

Third Stage. The decapitation at the Crook of Devon probably occurred at this stage, for the Crook of Devon is only 50 feet above

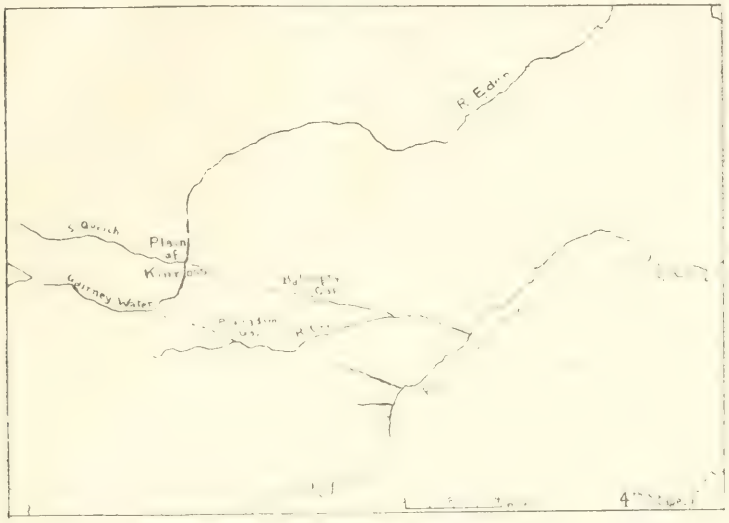


Fig. 5.

Blairadam wind gap, six miles away, showing that the river A was in an advanced stage when this capture took place. As will be seen later,

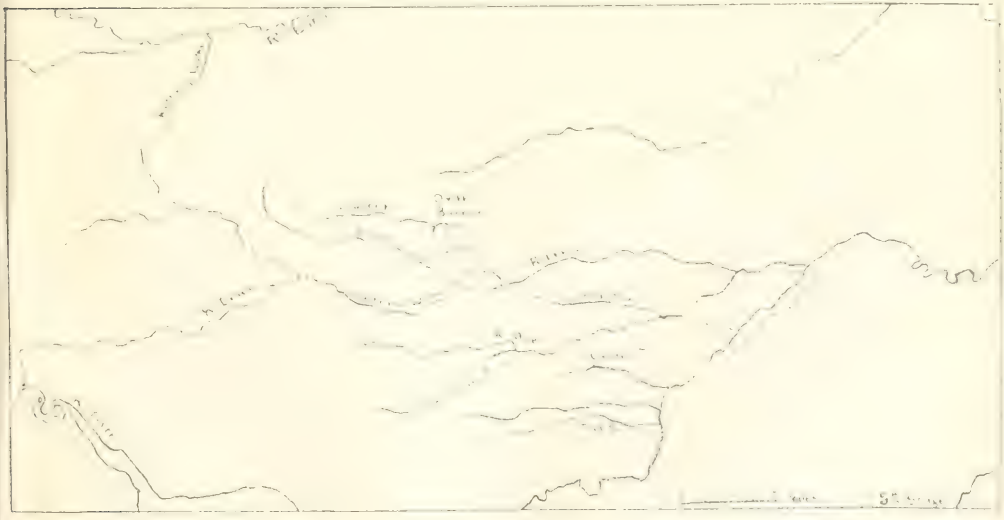


Fig. 6.

there are reasons for assuming that this capture preceded the one effected by the Eden. The capture is easily explained.

A stream working along the Ochil fault and cutting back from near Cambus would make rapid progress in the soft rocks on the south side of the fault, and would reach stream A at the Crook of Devon. Stream A would meanwhile be held up by the igneous rocks at the base of the Carboniferous. This completes the evolution of the modern river Devon.

Fourth Stage. The Eden valley, like that of the Earn, is a strike valley excavated in the Upper Old Red. Owing to its gentle fall, at present only 300 feet in 20 miles, it would progress more slowly than the lower Devon, 500 feet in 12 miles, and thus would not reach the Plain of Kinross until this stage. Had it got in earlier and beheaded the upper Devon we should have expected a greater drop from the Blairadam gap to Loch Leven than is the case (only 20 feet in half a mile). It would, however, effect the capture of the headwaters of stream B, and of that part of stream A which lay between the Crook of Devon and Blairadam, in this way producing the valley of the Gairney Water and the Blairadam and Ballingry wind gaps. It should be noted that the upper part of the Gairney Water valley points to the Blairadam wind gap.

Fifth Stage. The production of Loch Leven by a drift dam at Mawcarse is suggested in the Geological Survey Memoir on the Geology of West Fife and Kinross, and is in the author's opinion also the most probable explanation. Loch Leven is 351 feet Ordnance datum, and the Eden at Burnside, less than two and a half miles away, only 300 feet Ordnance datum.

THE INTERRELATIONS OF EUROPE AND ASIA AS EXEMPLIFIED IN THE NEAR EAST.

By Marion I. Newbigin, D.Sc. (Lond.).

(With Sketch-Map.)

Recent events in Armenia and the neighbouring regions have focussed public attention in this country upon a part of the world which has hitherto been regarded as of little general interest, and it seems therefore worth while to discuss some of the conditions which prevail there. It is becoming more and more evident that in one of its aspects the great European war is but an episode in that conflict between Europe and Asia which has been going on for many centuries. For a prolonged period Asia acted upon Europe, and the function of the eastern Europeans was largely to hold the gate against the incomers. But within comparatively recent times Europe has been reacting upon Asia, first by sea and then by land, and one of the causes of the war was the disputed question as to the powers which were to take the most active part in this reaction. Even though the future is still hid from us, it is possible to formulate to some extent the conditions of the problems concerned, and such a statement may be of help in finding the solution.

It is a geographical commonplace that the two fundamental human

occupations, when a large survey of the earth's surface is taken, are the cultivation of the land, which is in its turn dependent upon an adequate supply of water and sunshine during the growing period, and the pastoral industries, which can be carried on in regions of scanty rainfall, provided large spaces are available. Taking the Eurasiatic continent as a whole, we find that throughout by far the greater part of Europe cultivation is possible with the natural rainfall. In Europe pastoral nomadism is scarcely represented in its typical form, and the regions within which artificial watering is necessary are small in total area. Asia is far less favourably situated. Apart from the areas too elevated, or placed in too high latitudes for cultivation, the rainfall is insufficient over vast tracts, especially in the interior, and the supply of water artificially presents great difficulties in many regions, and is elsewhere impossible. If we limit ourselves to the warmer parts of the Continent, and to such broad general statements as are sufficient for our immediate purpose here, we may say that the chief agricultural lands of Asia lie to the east and south east, as in China and India, and that the central steppes and deserts are for the most part suited only for pastoral nomadism. But we have to add that from the right bank of the Indus, through Afghanistan and Baluchistan, Persia, Armenia and Anatolia, there runs a belt of mountainous land, bounded by water or by steppes and deserts, interpenetrated by similar steppes or deserts, generally deficient in rainfall, but capable in more or less isolated belts and patches of supporting cultivation of the southern European type generally dependent upon irrigation, the water being obtainable from the springs or snows of the mountain summits. The mountains of this belt are continued into those of southern Europe, and no sharp transition, geographically speaking, separates the lands of Asia Minor from those of the Balkan Peninsula. Thus this mountain belt from one point of view may be regarded as a link between the agricultural lands of southern Europe and those of eastern Asia, while from another it is a battle-ground of two modes of life, the Central Asiatic pastoral nomadism and the peculiar form of agriculture characteristic of the Mediterranean area.

As we follow the belt into Europe, two changes become apparent. In the first place the width of the mountain zone, which reaches some 800-900 miles in eastern Persia, diminishes greatly. The result is that the main lines of communication, which in Persia and further east tend to run *along* the mountain folds, in Europe cross these folds freely. Second, while in Asia the plains which bound the mountain zone to the north are, as we have seen, either deserts or steppes, that is regions of deficient rainfall, in Europe, whether in Bulgaria and Roumania or in Hungary, their rainfall is sufficient to support cultivation without irrigation, and the type of agriculture becomes Central European instead of Mediterranean.

In Europe, for reasons which have been often elaborated, the movements of peoples have tended to be north to south, or south to north, that is from the shores of the Mediterranean across the mountain chains to the northern plains, or from those plains southwards to the margin of

Bartholomew & Co. Edinr.

Sketch-Map of the Near Eastern mountain belt with the bounding seas and deserts. Note that as yet no railway enters Persia.

the sea. In Asia, on the other hand, partly because of the reason just given, the width of the mountain belt and the difficulty of crossing it, movement has taken place in a general east to west or west to east direction, along and not across the folds. Because of the huge Caspian Sea, and, further north, the transverse chain of the Urals, the movements, in so far as they affect Europe, have taken place chiefly along two great routes. The northern road leads through the Caspian Gate, that is through the gap between the Urals and the Caspian. Through this gate the pastoral nomads and raiders of the central Asiatic steppes were able in earlier days to pass into the plains of eastern Europe, and in the course of their journey found themselves travelling gradually into lands of greater rainfall, and thus into lands where cultivation becomes increasingly possible. Having learnt within the European boundary the economic advantages of cereal-growing over the rearing of animals, their modified descendants are now in the act of moving back again into Asia, with skill and knowledge which makes cultivation possible in regions once regarded as hopeless. But with this northern road and its history we are not directly concerned here.

The southern road leads through Persia, and, with a change in direction, into Asia Minor, and on across either the Aegean or the narrow straits into the Balkan Peninsula. Throughout its length the general type of country here remains the same. The loftier mountain chains, except in the Armenian "node," are marginal, and they tend, whether in Anatolia or, on a far vaster scale, in Persia, to enclose central desert or steppe areas, incapable of supporting anything but a scattered population, and in the case of Persia over considerable areas uninhabitable. Throughout its extension cultivation is possible in this mountainous belt in two sets of areas only. In the first place there are regions, as for example on the northern slopes of the Elburz range, which sink towards the southern shore of the Caspian, or round the coasts of Asia Minor, where local causes give rise to a higher rainfall than elsewhere. In such areas cultivation may be possible on unirrigated land. Secondly, since the mountains often reach a great height, and cover a large area, it is often possible to capture their waters in sufficient amount to irrigate considerable tracts of land. On these lands, generally placed near the base of the mountain ranges, and in Persia especially on their inner margin, it is possible to grow not only the usual Mediterranean plants, including many fruit trees and mulberry for silkworms, but also that important economic plant cotton, whose cultivation could probably be greatly extended, and cereals, the latter sometimes in amount greater than is necessary for local needs. Further, the presence of extensive steppe areas within the mountain belt, a fact to which we have already alluded, no less than the extent of high land, especially in Armenia, means that, in addition to their cultivated plants, these regions can produce animals on a scale which is scarcely suggested in the Mediterranean region in Europe. Sheep, kept chiefly for their flesh, goats especially for their coats, camels, yielding camel's hair, are among the more important animals reared. We may add that while the streams which arise in the mountains of Persia for the most part sink

finally into the sand of the inner deserts, the mountain knot of Armenia gives rise to the powerful streams known as the Tigris and Euphrates, which after emerging from the mountains are, like the Nile, able to traverse the thirsty desert in order to reach the sea, and thus make cultivation possible within the arid zone. In western Persia also a certain number of streams are able to penetrate the marginal mountains, and find their way to the Tigris or the Persian Gulf.

The belt we have been describing is, as we have seen, from one point of view a highway between the plains of India and south-eastern Europe, but it can be reached across its north-eastern and south western bounding walls by two sets of steppe or desert peoples, those of the steppes and deserts of Turkestan on the one hand, and those of the Arabian and Syrian deserts on the other. More than this, since the cultivator can carry on his peculiar mode of life wherever he can capture the mountain streams, the hither side of the mountain slope, *e.g.* in Turkestan or Mesopotamia, is as suited to his activities as the near side. The Persia of to-day has kept the northern slopes of the Elburz range within her territories, but further east the boundary between Persia and Asiatic Russia runs along the mountain crests, and this although many of the peoples of Turkestan have a strong infusion of Iranian blood, and are carrying on, on the northern slopes, the same mode of life that the Persian carries on within the boundaries of his own country. In other words, in this region no less than further west particular racial and social groups are not confined to the country which is in theory their home, nor, as we shall see, do they occur unmixed with other groups within that country. This is one of the reasons of the troubled politics of the Near East.

Again, when the Turkestan nomad pierces the mountain boundary of Persia, he finds beyond the limiting chains, in the heart of the country, steppes and deserts like those he has left, regions where his special mode of life is perfectly practicable. Thus Persia is not only a highway, it is a centre from which at one time cultivators may spread out into the surrounding regions, following the streams till they sink into the sand. At another time the steppe people surmount the mountain barrier, and pour like a flood over the cultivated lands.

As we follow the mountain belt to the north-east, however, as already stated, it narrows notably, and a continuous influx of central Asiatic nomads, or of Arabian nomads, into the area further south and east will cause a westward movement of peoples, through Armenia, into Asia Minor and so on to Europe. Since for a prolonged period the influx of nomads has been a more marked phenomenon than the outflow of cultivators, we have both an extraordinary jumble of races in Anatolia and Armenia, and all sorts of social maladjustments.

We need not stop to consider the actual races represented, for an excessive emphasis on race is apt to obscure some of the essential elements of the problem. Let us rather consider what happens when lands occupied by sedentary cultivators are over-run by warlike nomads. In the first place, as is well seen in Persia, the cultivator dependent upon irrigation tends to be a town-dweller. Irrigation on any consider-

able scale can rarely be carried out by the individual family group: combination is necessary to establish and maintain the requisite canals. Further, certainly in Persia, the cultivators have few warlike instincts, and as fighters are inferior to the nomads. Their tendency is rather to seek shelter in some fortified place when invasion threatens than to attempt a pitched battle against a mobile foe, who may in the general case be expected to plunder and destroy, and then return whence he came.

But if this is the more normal procedure, there must also occur instances when, owing to temporary fluctuations in the rainfall, or increase of population beyond that which the steppe will bear, the incomers prefer to stay than to return to the scarcity of the steppe. Their scanty property makes this course easy to them: they have little to lose and possibly much to gain by a change of residence. But if they establish themselves in a region of cultivation, they come sooner or later under the influence of the natural conditions, a change often accelerated by intermarriage with the conquered group. Thus while they may retain all their consciousness of superiority, they generally tend more and more to adopt the customs, the mode of life, sometimes even the language of the people they have conquered. This is one of the reasons why throughout the Near East it is often so difficult to determine the race to which special groups belong. In Asia Minor in its widest sense, and in the adjacent areas, the agricultural peoples are quite generally the modified descendants of pastoral nomads, who have acquired some of the characters of earlier peoples, and show often considerable intermixture of blood. Even in the Balkan Peninsula the Bulgars, for example, are apparently in part a Tatar stock who have acquired the habit of cultivation, and also many of the characters of the Slavs who were earlier immigrants into the area.

Since, however, the land capable of cultivation is small in total area, and is always liable to diminish in periods of unrest or maladministration, the adoption of the agricultural life by certain of the incoming nomads almost necessarily involves the displacement of some of the original cultivators. What becomes of these? A proportion of them may be compelled to adopt the nomad life, but the tendency which the cultivators show to live in groups, forming towns or villages, and the abundance of local raw material, including minerals from the mountains, means that many minor manufactures, often of considerable artistic merit and value, exist. Thus there is the germ of a commercial and trading class, a class unrepresented among the nomads. Now when an area is overwhelmed by incoming nomads, so that the social organism is thrown out of gear, and the security necessary for successful agriculture ceases to exist, the tendency will be for a proportion of the original cultivators to take to trade. Further, in the general uncertainty their instinct will be to devote themselves as far as possible to objects of small bulk in relation to their value, which can be easily handled, easily hidden. In the carrying on of trade, which may take all forms from minor manufactures and peddling to the conduct of considerable financial operations, the original cultivators will profit at the expense of the

nomads in so far as their previous mode of life has given them greater knowledge of men, greater astuteness and far-sightedness.

Further, and this is a point which should probably be stressed, the fact that under the new conditions they are likely to be excluded alike from the defence of their country, from its administration, and from any part in the making or modifying of its laws, will tend to deprive them of patriotism in the ordinary sense. Thus the emotions and energy which in more normal conditions are placed at the disposal of country will be available for the purpose of the maintenance and aggrandisement of the individual or of the family.

In Europe generally the Jew is universally regarded as the type of this kind of man, of the individual without country, unconcerned with agriculture, with war, or with administration, and concentrating upon material advantage the energy which other men diffuse in many different forms of activity. But it is to miss one of the most essential facts of Near Eastern politics not to realise that the Armenian, the Greek, some Persians of pure Iranian blood, have throughout the region we are considering a quite similar reputation, arouse in the surrounding agricultural populations quite the same feelings with which the Jew is regarded, say in Russia. These surrounding populations are often people of mixed race, in process of adaptation to conditions in which their earlier racial traditions are of little guidance, full of hereditary contempt for the peaceful and wily trader and financier, but constantly finding in the course of their daily life that they are unable to dispense with him, and are far from being his match in intelligence.

The contempt which Colonel Sir Mark Sykes expresses in his *The Caliph's Last Heritage* (cf. p. 89) for the Armenians, a contempt which many have thought too strongly expressed at a moment when that unfortunate race is suffering so terribly, is but an indication of the feeling which such groups are apt to arouse. In the United States, we are told, the Armenians, in popular opinion, are regarded as virtually identical with Jews, in spite of the difference of religion, and many American "Jews" are, in point of fact, Armenians. Both Jews and Armenians, it may be noted, when they are traders in the limited sense, tend to deal in precious stones, curios, and valuables of all sorts. Similarly, the statement that Bulgars and Greeks are "hereditary enemies," a statement which has bulked largely in the newspapers lately, is another expression of the same feeling. The hatred in this case is not really, as the form in which it is expressed would suggest, directed against the Greek state. There are believed to be as many Greeks outside of Greece as within it, and in the days of the larger Turkish empire they exploited their fellow subjects of non-Turkish races, themselves, like the Bulgars and the Anatolians, often the modified descendants of pastoral nomads, as remorselessly as ever Jew exploited Christian. In the case of the Jew the religion makes a convenient excuse for hatred, but the antagonism is based upon something deeper and more fundamental even than a religious difference.

From the Pamirs to the Balkans then we have countries and states, within the zone where cultivation is possible, in which the main elements

of population, whatever the races concerned, are first displaced cultivators who have been excluded alike from agriculture and from administration, who busy themselves with various forms of trade, and form a disintegrating element wherever they occur. They are almost always bitterly hated by the second group, which consists of cultivators, with varying amounts of nomad blood in their veins, in process of adapting themselves to the sedentary life.

In addition, however, there is usually a third element which, in the case of the Balkan Peninsula and Asia Minor, has acquired an importance in the eyes of the western world which its numbers do not always justify. When the nomads overrun the irrigated lands of the mountain zone, or, further to the west, within Central Europe, the moist steppes and plains where cultivation is possible without irrigation, a proportion of them, as we have seen, take to agriculture, and blend to a greater or less degree with elements of the original population. But there is also a certain number who are unable to abandon the free life of the warrior for the toil of the husbandmen. Their contempt for agriculture is only equalled by their contempt for trade: for them, as for the knights of the Middle Ages, fighting and plundering are the only occupations fit for a gentleman. They form the military caste in the invaded states, and since plundering in its more direct forms is not usually a permanent source of income, they became also administrators, administration as interpreted by them being merely a kind of robbery of the agricultural peasant, conducted more or less according to certain rules. Of this element the Osmanli Turk throughout the Near East is a good example. His history and his position explain clearly enough the two portraits which are constantly being drawn of him. The one represents him as the gentleman *par excellence*, grave and dignified, free alike from the avarice and the wiles of the Jew, Armenian and Greek on the one hand, and from the servility and pettiness of the cultivator. According to the other representation he is cruel and treacherous, incapable of sustained effort in any direction, and of any form of rule save that which depends upon constant massacres. But we should remember that even if he be expelled from his dominant position in the tract which he now misrules, the difficulties will not, as many lightly assume, at once disappear. Greek and Bulgar, Armenian and Kurd will still have many scores to settle: and the fact, so often overlooked, that the Greeks do not all dwell in Greece, nor the Armenians only in Armenia, will remain unaltered.

Certain groups of Kurds, it may be noted, represent in Armenia and elsewhere a stage somewhat earlier than that which has been reached by the Osmanli Turks in European Turkey. They have a similar contempt for agriculture and for trade, but they are less Europeanised, and not being always able to live as does the upper-class Turk, that is upon taxes or tribute wrung from the agricultural peasant, they do not disdain the pastoral industry of their ancestors. No less than the Turks, however, are they averse to that other ancestral trade of plundering, and the Armenians form, alas! a too easy prey. The trader also, it should be noted, more especially if he be financier as well, is not only worth

robbing, but, since he cannot easily be enslaved as can the agricultural peasant, is likely to be massacred as well, on the same principle as that on which primitive folk kill the hive bee to get its stores of honey, while they keep the cow for its constant supply of milk. One of the justifications of European interference in such regions is that the European protects both the agriculturist and trader against the warrior caste.

The difficulties of Near Eastern politics are more likely to be appreciated if it is realised that through all the complexities of race in the different sections there runs this fundamental contrast of agriculturist, largely a stranger to the lands he tills, trader, often, whether by choice or by necessity, living under an alien rule, and finally the warrior caste, whose members regard trader and agriculturist with equal contempt, and may or may not retain their original pastoral nomadism. Much of the current talk about the principle of nationality as a guide in the final settlement is in the Near East totally without meaning.

An interesting little fact which is worth remembering in this connection is that at the time of the First Balkan War a large part of the inhabitants of Salonika made no secret of their preference for Bulgarian rather than for Greek rule. But then among these inhabitants Jews of Spanish descent are numerous, and there is no great difficulty in understanding why, if the Turk had to go, a trading community should prefer Bulgarian rule rather than Greek. The Turk was too contemptuous of trade to wish to share its profits, and in Europe habitual massacres for plunder are too dangerous. But the methods of the Greek trader are too like those of the Jewish one for the one to welcome the other.

So far we have been concerned exclusively with the movement of Central Asiatic nomads towards a belt of land which, if geographically for the most part Asiatic, is in many of its features Southern European. We have, however, also to consider that reaction of Europe upon Asia which has helped to involve most of Europe in war. This reaction is motived by two facts: first, that along the mountain belt we have been considering lies one of the roads from Europe to the productive parts of Eastern Asia; and, second, that under European guidance these lands could be made to produce considerable amounts of the kinds of products of which industrial Europe stands most in need, could supply it also with the markets for manufactured goods which form another of its needs. As the first point can be treated somewhat briefly we may begin with it.

We have already emphasised the fact that the mountain belt has always been, and is still to some extent, a line of migration from Asia into Europe. When the western Europeans first began to establish relations on a large scale with eastern Asia, they took the sea-road, at first the long sea-road, and later the shorter one through the Suez Canal. The short sea-route meant a displacement of the traffic from the mountain belt to the ocean which lies to the south of it, and the result of its use was to diminish the importance for Europe of the greater part of the Near East and to turn both Asia Minor and Persia into culs-de-sac. But there is no reason

to believe that this condition will endure. Already Asia Minor is penetrated by railways forming part of a system which it is intended to extend to the Persian Gulf, and which would then give that country throughout part of its extension significance as a highway of trade. Probably one day also a railway placed somewhere in the southern half of the Asiatic continent will connect Europe with India directly by land. Even as it is the Trans-Caspian line, which runs at the base of the north-eastern frontier—a frontier which is political and not geographical—of Persia, and is connected up with the Trans-Siberian, suggests that Persia and the neighbouring lands will some day be traversed by main lines of communication. Necessarily therefore, the Great European Powers are interesting themselves in their fate.

But while in the future railway construction may make these Near Eastern lands important as highways of trade, they are more immediately interesting in that they contain peoples accustomed to the cultivation of semi-tropical produce, and lands which, under better systems of government, could be made far more productive than at present. Now the European Great Powers require for their manufactures an enormous amount of raw material, and they prefer, when they can, to purchase this raw material from peoples who will offer them in return a market for their manufactured goods. The southern United States grow an enormous amount of cotton, the cotton upon which the manufacturers of Europe still practically depend. But the United States endeavours, as far as possible, to shut out the goods manufactured in Europe from her own lands—she wants to sell food and raw material, but not to buy manufactures in return.

Throughout much of Africa there is a negro population which has little aptitude for agriculture, and cannot be depended upon, even when climatic and other conditions are favourable, to produce much raw material. Australia is scantily peopled, having virtually no native population which might serve as a reservoir of labour, and no less than America is anxious to promote home manufactures as far as possible. Generally, therefore, those parts of the world which have a laborious population accustomed to cultivation, but not sufficiently organised to have developed industry of the modern type, are few in number, and the Great European Powers are thus all the more anxious to acquire a predominating influence in such regions, wherever they can, and by whatever form of connection may be possible. The belt we have been considering is the most striking example left of unorganised, or inadequately organised, lands, which under the control of a European state or states might form valuable possessions: hence the competition for them.

It is not necessary here to elaborate the point that both this country and France have acquired a predominating influence in lands of the type just discussed in various parts of the globe: the fact is sufficiently obvious. It is, however, perhaps a less familiar fact that Russia, whose Asiatic possessions are often thoughtlessly regarded as all of extreme climate, has in Turkestan and on the borders of Persia possessions capable of producing large amounts of semi-tropical produce.

Russian Turkestan formed the object of a memoir published in 1914

by Professor Woeikoff of Petrograd, reviewed here in vol. xxxi. p. 35, and from the concluding chapter of his book we quote the following passages,[1] which throw a flood of light on the general problem we are considering :—

"Has the acquisition of Turkestan been an advantage to Russia? What has the country brought to her? The conquest had become a necessity : it put an end to the incursions of the nomads, which were encouraged by the sovereigns of Turkestan, the Emir of Bukhara and the Khans of Kokand and of Khiva : it has given us a country blessed with abundant sunshine, rich in agricultural products which could not be cultivated either in Russia in Europe or in Siberia.

"At present Turkestan supplies nearly half the cotton employed by the Russian factories, as well as much other raw material, and it constitutes a large market for our manufactured goods. Further, since we have constructed railways, and abolished brigandage, the neighbouring countries[2] have also begun to sell their raw material to us, and to buy our manufactured goods.

"To the natives the Russian conquest has given peace and security, and an administration which, though doubtless imperfect, is greatly superior to that which preceded it, as may be seen by noting what happens in the vassal khanates of Khiva and Bukhara, which are still under the régime which prevailed in Turkestan before the conquest. Further, even there the population is at least rid of their fear of the nomads. It is well known that in Persia the conditions are worse still, especially since 1907."

This gives a perfectly clear and dispassionate statement of the case, and it is obvious that if Turkestan, which after all is largely desert, is thus a valuable possession to a European power, Persia, Asia Minor, Mesopotamia, and the adjacent lands would be in parts even more valuable. Further, we must in justice admit that if Britain, France, and Russia are justified in extending their dominion or their protectorate over such types of lands, they have no right to complain if the Central Powers seek to do the same thing. In so far as Germany's designs on Asia Minor were concerned, however, before the war no active protest was being made by the Powers who are now the Allies, and the war was not of their seeking. Germany's mistake was to believe that she could suddenly, by the exercise of military force, attain to the position which the other great colonising powers had reached by a slow process of growth, and by yielding step by step to the logic of events. Nor does her history as a ruling power inspire confidence in her capacity to govern justly unorganised peoples. Thus though there is a certain, but apparently small, party in this country which in the earlier stages of the war openly expressed a desire that the issue of the conflict should place Germany in possession or in control of Asia Minor, one can only say that at the present moment the probabilities of this occurring seem small.

The case of Austria-Hungary is somewhat different. She possesses

[1] The passages are translated from the French, the original will be found on pp. 329-330 of the book.

[2] "The Persian province of Khorassan, and the northern provinces of Kashgaria and of Afghanistan."

no colonies at all, so that her desire to extend her boundaries may seem natural enough. But she has within her lands a very large Slav population, whose natural aspirations she has entirely failed to satisfy, and her advance to the East, if it occurs, must necessarily be through the lands of the free Slavs. But those free Slavs have had too clearly before their eyes the fate of their fellows within the grip of the double monarchy not to resist to the death the attempt to override them, and with their resistance we come to one of the root causes of the war.

NOTES ON SWEDEN, WITH SPECIAL REFERENCE TO THE FORESTS IN RELATION TO INDUSTRY AND COMMERCE.[1]

(With Sketch-Map.)

THE south-eastern part of the old Scandinavian plateau, situated almost entirely in latitudes north of that of Edinburgh, forms the kingdom of Sweden. In size the country ranks sixth among European countries, being almost half as large again as the British Isles: in population, however, it takes only twelfth place, with slightly less than one-eighth as many people as the United Kingdom, and, in fact, with fewer inhabitants than Greater London; it contains more than one and a half times as many people (32) to the square mile as Norway (19), but has not half so many as Russia (72), which, after Scandinavia, is the most sparsely peopled country of Europe.

Physically, Sweden falls into four regions—the Highland district of Upper Sweden; the Lowlands of Central Sweden; the Smaland Highlands; the Plains of Skane.

The Highland district of Upper Sweden may be subdivided into three belts which are demarcated roughly by the contours at 600 and 1500 feet. Thus we have the mountain and lake belt above 1500 feet rising to the "keel" (Kölen) or watershed, where it forms the boundary with Norway. This most elevated part of the ancient continent of Arctis consists of a deeply dissected plateau of Archæan rocks, on which, owing to long-continued erosion, followed by the severe conditions of the Glacial epoch, denudation has given a rounded form to even the highest peaks. Only a few peaks of exceptionally hard eruptive rock have retained the rugged grandeur usually associated with lofty mountains. From the more strictly geographical aspect it is noteworthy that there are numerous comparatively low passes across the "keel," so that this highland barrier is not so formidable from the point of view of communications as from the climatic standpoint. Earth movements and glacial moraines have formed many mountain lakes of great size (Hornavan-Storavan has an area of 275 square miles), lying between 900 and 1400 feet above the sea. There are also over 200 glaciers, covering an

[1] Except where definitely stated, the material for this article is derived almost exclusively from *Sweden: Historical and Statistical Handbook.* By order of the Swedish Government (Second Edition). J. Guinchard, Editor. Vol. I. "Land and People." Vol. II. "Industries." Stockholm: Government Printing Office, 1914.

area of about 135 square miles. Large parts are mountain moorland with a lowly flora of lichens, mosses, and a few flowering plants. Only on the slopes does the birch (*Betula odorata*) struggle upward; below comes the Norway spruce (*Picea excelsa*), which gives place in more northerly latitudes to the Scots fir. In this subdivision cultivation is carried on, and is capable of extension in the fine glacial loams of the valleys.

Between 600 and 1500 feet is a region of old moraines with recent peat mosses and marshes, the latter covering between 15 to 30 per cent. of the area. This subdivision is the chief source of Sweden's forest wealth, the timber belt extending in the same direction as the country for over 600 miles with a breadth of from 100 to 150 miles, giving a total area of approximately 40,000 square miles, more than one-fifth of the total area of Sweden. Scots fir predominates on the drier, Norway spruce on the wetter, parts. Little cultivation is possible in the district, but the mineral wealth is very great in the north, where Gellivara is the centre of the rich Lapland iron-ore mountain region.

Between sea-level and 600 feet is the marine sand and clay belt, much of which has been raised above sea-level by tectonic action. Agriculture thrives along the lower river plains, while pine-trees grow abundantly on the fields of coarse sand along the upper limit of marine deposits. As the coast is still extending into the Gulf of Bothnia, owing to the uplift of the land, more coastal plain becomes available for settlement. On these parts coniferous forests make their appearance, usually preceded by a belt of speckled alder (*Alnus incana*).

To the south of the Highland region are the Lowlands of Central Sweden, stretching from the Sound by the lake depression to the Baltic shore. This lowland area is to be explained by faulting in the underlying rocks, so that in the Glacial period it was submerged under the sea. Thus the surface is thickly covered with marine deposits of great fertility, on which the national power of agricultural Sweden was based. The region is broken up by many forest-covered "horsts," but, on the other hand, unequal depression over the area has brought about the excellent water highway of the great lakes across the region. Numerous "eskers," left in the Glacial Age, cross this region from north-north west to south-south-east. They are of value in that they afford a plentiful supply of excellent water, while the gravels of which they are composed are put to a number of uses. The Baltic islands of Gottland and Oland are covered with pine forests.

The Småland Highlands are a replica *in petto* of the moraine and peat-bog region already described: indeed, they are a disconnected part of the highland area. Extensive forests of pine and spruce, with a sprinkling of birch, cover the region. Owing to the more favourable climatic conditions many of the peat mosses are reclaimed—an operation that is not attempted in the middle highland belt.

The fertile plains of Skane lie in the extreme south. This is the most densely peopled part. Cultivation takes the place of forest industries, but there are large areas under trees, the beech taking the place of the fir and pine.

Temperatures, &c., of Places in Sweden.

Places.	North Lat.	East Long.	Height above sea-level (feet).	Mean daily Temperature in Fahr.				Date when each season begins.								Length of season in days.			
				Jan.	Apr.	July.	Oct.	Winter.		Spring.		Summer.		Autumn.		Winter.	Spring.	Summer.	Autumn.
Karesuando,	68°25′	22°29′	1093	6·7	28·9	53·6	27·1	Oct.	6	May	9	June	21	Aug.	17	215	43	57	50
Jokkmokk,	66°36′	19°51′	837	6·0	29·7	57·7	29·8	,,	11	Apr.	23	,,	8	,,	27	194	46	89	45
Haparanda,	65°50′	24°9′	30	12·2	28·9	58·8	34·7	,,	22	,,	26	,,	8	Sep.	4	186	43	88	48
Umeå,	63°49′	20°17′	39	17·1	31·8	58·8	36·9	,,	30	,,	17	,,	4	,,	7	169	48	95	53
Sveg,	62°3′	14°22′	1132	13·6	33·8	57·6	34·7	,,	23	,,	11	,,	1	,,	2	170	51	93	51
Upsala,	59°51′	17°38′	79	21·6	37·2	61·4	41·2	Nov.	15	,,	1	May	23	,,	18	137	52	118	58
Stockholm,	59°21′	18°35′	141	27·0	37·8	61·9	43·3	,,	26	Mar.	27	,,	23	,,	24	121	57	124	63
Orebro,	59°16′	15°13′	145	26·1	38·6	61·9	42·5	,,	20	,,	27	,,	18	,,	20	127	52	125	61
Stromstad,	58°56′	11°11′	30	28·8	40·6	62·8	44·8	Dec.	4	,,	20	,,	14	,,	28	106	55	137	67
Jonköping,	57°47′	14°19′	342	28·8	38·6	61·0	44·1	,,	5	,,	21	,,	23	,,	24	106	63	124	72
Vestervik,	57°46′	16°39′	13	29·1	39·0	62·1	44·8	,,	11	,,	16	,,	21	,,	29	95	66	131	73
Gothenburg,	57°42′	11°58′	30	31·3	41·9	62·4	46·1	,,	27	,,	7	,,	12	Oct.	4	70	66	145	84
Visby,	57°39′	18°18′	52	31·5	38·5	61·0	46·2	Jan.	1	,,	16	,,	28	,,	2	74	73	127	91
Vexjo,	56°53′	14°49′	551	27·7	39·6	61·6	43·3	Nov.	29	,,	21	,,	17	Sep.	23	112	57	129	67
Lund,	55°42′	13°12′	125	30·6	41·2	61·5	46·1	Dec.	21	,,	3	,,	14	Oct.	3	72	72	142	79

NOTE ON SEASONS.

"Summer" is that part of the year during which the mean daily temperature of any place is higher than 50° F.; "Winter" is the time when this temperature remains below freezing point: "Autumn" and "Spring" are the intermediate periods.

These broad natural regions are also climatic regions, because they follow closely the latitudinal extent of the country. The accompanying tables are adapted from the section on "Climate" in Vol. I. of the Official Handbook. They show that the climate of Sweden is rather extreme than equable, but partakes of both climatic types. It is maritime, for example, in that it benefits to some degree from the mild, wet, south-west cyclonic winds; it is continental in that its summer temperatures are high in relation to its latitude, and its maximum rains fall in late summer, while the period of minimum precipitation occurs in February, March, or April. Generally, while the slope of the land favours continental conditions, the path followed by cyclones, as well as the short distance intervening between the country and the warm Atlantic winds and currents, give many maritime features, especially in winter. But there are several local peculiarities that must be borne in mind. Northern Sweden is cut off from Atlantic conditions by the high plateau, and at the same time is in itself higher than the remainder of the country, so that the winter temperatures are exceptionally low. The shortness of the Swedish summer is counterbalanced to a considerable degree by the length of the summer days, and their abundant sunshine. "This is partly due to atmospheric refraction, which increases the average length of the day by 30 minutes in the northern, and by 15 minutes in the southern part of Sweden, the corresponding figures at the equator being only 4 minutes. Still more important is the influence of twilight, which adds several hours to the length of the day during the summer in the north of the country. In fact, there is uninterrupted daylight as far south as Hernosand (62° 37') from June 16 to 27." The more abundant sunshine in summer "is explained by the length of the time during which the sun is above the horizon, and also by the relative scarcity of clouds in Sweden at this time of year. On an average for the whole country, only 50 per cent. of the sky is covered with clouds during the month of June, as compared with 74 per cent. in December. This phenomenon, of which the cause is unknown, has an exceptionally favourable influence on the climate of Sweden, for the heating effect of the sun's rays is thus relatively unimpared in summer, whereas the loss of heat caused by radiation is considerably diminished in the winter season, which results in a relatively hot summer and only a moderately cold winter." Another interesting point depends also upon the time the sun is shining, for the length of daylight tends to decrease the night-frosts which, towards the end of summer, are dangerous enemies to the farmer.

Snow falls everywhere in winter, but, of course, remains unthawed much longer in the north (170 to 190 days against 47 days in Skåne). The protective effect of snow on agricultural land is well known: the part it plays in forestry will be discussed later. It is a common fallacy that the Baltic Sea is frozen in winter. Although the Sound has been frozen sufficiently hard to drive across in very severe winters, the west and south coasts are generally open, and even the Baltic shore is only exceptionally ice-bound. In the Baltic drift-ice is, however, common, often forming enormous masses of pack-ice. "Only during the mildest

winters can navigation in these waters continue through the whole season without interruption. During the very severe winters the Aland Sea (the strait between the Baltic and the Gulf of Bothnia) is covered with trafficable ice." The Gulf of Bothnia is as a rule covered with ice in its northern parts every winter (November to May), but to the south only the coastal waters are frozen.

An interesting paragraph, concluding the section on "Climate," deals with the influence of forests on climate. This influence scarcely affects temperature and humidity, but causes an increase of rainfall, which is very slight in all regions, and most marked on the coasts. Owing to the difficulty of measuring the precipitation exactly, the real amount of the observed increase is not known, and it is probable that the greater part of it is due to errors of observation.

While the soil and climate of Sweden, as regards farming, are to be reckoned by no means as specially favourable, the prospects of forestry, if directed scientifically and administered economically, are bright and hopeful. For "it is beyond argument that the forest land in Sweden, with the conditions secured by nature, can, with reasonable care, produce far more than virgin forests have done." We have already indicated that large parts of Sweden are covered with forests, and may proceed to discuss the distribution of these, and explain the part they play in the economic policy of the country.

Forests cover 52 per cent. of the land surface of Sweden, while arable land and natural meadow, on which the "mother industry" (agriculture) is practised, occupy only 12 per cent. of the land area. Though agriculture absorbs a larger percentage of the population than in western Europe generally, yet both relatively and absolutely it employs fewer of the inhabitants than in 1870, while other industries, trade and transport, have absorbed, and continue to absorb, a larger number and percentage of the population.

Population of Sweden in Main Groups according to Occupation.

Professions.	Population.			Percentage of whole Population.		
	1870.	1900.	1910.[1]	1870.	1900.	1910.
Agriculture and fishing, .	2,995,844	2,756,704	2,663,000	71·9	53·7	48·2
Industry,[2] . . .	613,414	1,484,230	1,831,000	14·7	28·9	33·2
Trade and transport, .	210,940	544,324	670,000	5·0	10·6	12·1
Public service,[3] . .	348,327	351,183	358,000	8·4	6·8	6·5
Total, . . .	4,168,525	5,136,441	5,522,000	100·0	100·0	100·0

We have just seen that more than half of the surface of Sweden consists of forest land. This large percentage, exceeded in Europe only by Finland, is due to the nature of the land surface in conjunction with the climate. These favour the growth of forests, which are not par-

[1] Estimate. [2] Includes forestry and mining. [3] Includes professions, arts, etc.

ticularly exacting in their requirements. "The permanent snow-covering of winter is the chief cause of the presence of forests in North Russia and Sweden, although the annual rainfall is much less there than in western Europe."[1] The rainy autumn and snowy winters provide sufficient moisture for all seasons, and the mild moist winter winds do not cause excessive transpiration in a season when the activity of the roots is at a minimum.

Except in the Alpine region, where tundra conditions prevail, and cold desiccating winds cause excessive transpiration when the tree can least easily replace the moisture, the forest is the natural plant formation of Sweden. But owing to variations of temperature as well as of other climatic phenomena, there are differences in the composition of the forests from north to south. These differences have been accentuated by human agency which, acting on an economic principle, cultivates trees that will yield most profit, while expelling those that are of less commercial value.

Four forest regions may be roughly distinguished: (1) the birch forest region, (2) the northern region of coniferous forest, (3) the southern coniferous forest region, (4) the region of beech forest.

Birch forests are particularly interesting as contradicting a prevalent notion that only coniferous trees persist in higher latitudes and altitudes.[2] In Sweden the birch forest is found above 1500 feet in northern Lapland, above 3000 feet in northern Dalarne (its southern limit). In the northern area, moreover, this forest has its greatest extension, stretching for some 20 miles with a vertical range of from 450 to 650 feet. These forests are usually thin and low, and in addition to birch (*Betula odorata*, var. *subalpina*), aspen (*Populus tremula*) and rowan (*Sorbus aucuparia*) occur.

The northern and southern regions of coniferous trees are naturally divided by the northern limit of the oak (*Quercus pedunculata*). Scots pine (*Pinus silvestris*) and common spruce (*Picea excelsa*) are the dominant trees, but in the northern region the common birch is widely distributed, and aspens, willows, wild-cherry trees, and rowans are not uncommon. To the south of the region, especially in the warmer parts, the elm, lime, maple, ash, and hazel are survivals of a formerly wider distribution. But pine and spruce are the commercial desiderata, and struggle in a natural manner between themselves. For example, if the pine does not reproduce itself under the shadow of the spruce, the wood develops into a spruce forest: forest fires play havoc with the spruce, but may leave the pine unscathed to scatter its seed in the ground fertilised by spruce ash. Here also man has played an important part. By a too careless cutting of pine an insufficient number of seed trees has been left, and the spruce soon covers the region. Afforestation by means of these two trees requires care because the spruce grows slowly, so that the sylviculturist, to secure future equality of development in his plantation, sows pine seed at the same time that he plants spruce seedlings.

[1] Woeikof, quoted in Schimper's *Plant Geography*, p. 557.

[2] Cf. Schimper, *Plant Geography*, p. 557.

The region just described is the great timber region of Sweden. In the southern belt of coniferous forest, owing to warmer summer conditions, there is a much higher proportion of deciduous trees, collectively called the oak-flora, and including, in addition to the oak, the deciduous trees specified above. But, on account of the better climate, large tracts have been cleared for cultivation, and the plains round Lake Malar, in lowland Merke, Ostergotland and Västergotland, as well as the area below the marine limit, are among the most important agricultural districts of Sweden. Moreover, as climatic and soil considerations would suggest, it is the oak-flora mainly that has been cleared. The coniferous forests consist largely of pine and spruce of nearly equal age, though as in the northern region there are pure forests of each. The southern limit of coniferous trees is determined by the immigrant spruce, which has advanced southward from Finland, whence it came.

To the south of this limit, in the region most favoured both in climate and in soil, on parts not yet brought under the plough, are the beech forests. Again, though the name is given from the predominating tree, oaks (*Quercus pedunculata* and *Q. sessiliflora*) are also common.

It is to these forests that Sweden looks for her future: in them lies vast wealth, to be exploited with discrimination under the guidance of those who have made the most careful study of forestry in all its aspects. And it is just in proportion to the careful husbanding of her forest resources that the future of Sweden is assured. For, despite the enormous development of metal industries, the demand for timber has steadily increased, especially in advanced countries where least is produced: our own country is an awful example.

Many difficulties present themselves to the Swedish Government, which sees by far the largest of her forest-bearing areas in the hands of private owners who may, but often do not, administer them in the best way. Hence the various Forest and Conservation Associations and Boards, Forest Legislation, the Experimental Service, and the Institute and Schools of Forestry with their officials and foresters. So far as theory is concerned, Swedish forests are well cared for.

The qualities that determine the commercial value of Swedish timber are well expressed by Dr. Ekstrand:[1]

"The kinds of wood which Sweden exports are almost exclusively pine and fir. The north and centre possess a remarkable variety of the former. The northern pine (*Pinus silvestris* L., var. *lapponica* Fr.) is characterised by needles which are shorter, broader, harder and more lasting, by cones of a clearer colour, etc., as well as by a trunk which, above all, if the tree grows surrounded by fellows of unequal age, or if its flanks are kept in the shade by some means or other, assumes a handsome cylindrical form, tapering slowly and gradually from base to summit, with a spreading crown, small and easily broken branches, of a timber extraordinarily rich in sap. It is those qualities of the northern pine—the columnar form united with great length, the absence of branches along the trunk, and the strength of the wood—which make it so

[1] Trans. from quotation in H. Key, *La Vie Économique de la Suède*, p. 16.

valuable. Several varieties of the southern pine have a wood as hard and strong; however, the compactness of the northern pine is due to the fact that the annual rings are closer together, and not to the greater quantity of resin. This is what makes it more suitable for carpentry. The northern fir, the spruce, occurs in Sweden in many more or less remarkable botanical forms. . . . Its wood is also more compact and less branched than that of the firs of central Europe, which makes it more suitable for flooring and carpentry work."

As in other cold temperate lands lumbering is a winter industry in Sweden. The work of the lumbermen usually begins in October or November and is continued all winter, because then the available labour is greater, the felled timber can be most easily brought out of the forest (on sledges), and the sawn goods from timber felled in winter are better. Work is commenced on trees farthest from the floating ways. The roads leading to these floating ways are usually well made and broad, with many tracks leading from them, and are often flooded to provide a good ice surface.

To secure that only selected timber has been felled the trees to be cut are marked on both the trunk and the root. Trees are sawn down to obviate undue loss of wood by axe-chipping. Similarly the saw is applied as near to the root as possible, so that it is necessary to remove the snow round the trunk where it may be 3 feet deep. The cut trunks are then "adapted" into logs for transport, and the farther these have to be carried, the longer they must be in order to cover the cost of carriage. Generally logs for sawing are 15 feet long with a top diameter of 5 inches for white, and 6 inches for red wood: building timber from 28 to 32 feet long with a minimum diameter of 7 inches. The load for a one-horse sledge on frozen roads consists of ten to twelve logs of 18 feet in length. Reindeer replace horses in the far north, and human labour is necessary where draught animals cannot be used. Such parts are fortunately few, and the method adopted is to slide the logs down snow-covered slopes.

Although some timber is conveyed to the mills by rail, floating is the usual method. Floated timber is considered less liable to warp, is freed from resin and sap, is easier to work, and has a more even colour: unfloated timber is supposed to be more durable. Britain will take only floated timber, but other countries are not so particular.

The numerous rivers of Sweden are peculiarly suitable for the floating of timber, as they follow comparatively straight courses from the interior to the shore. Flowing from north to south they thaw from mouth to source, so that the floods are not troublesome, and as their courses lie below the general level of the plateau they seldom overflow their banks. Where, as in the rivers of southern Sweden and in the smaller streams and tributaries of the northern part, the water supply is insufficient except in time of flood, the many small lakes along the courses have been dammed cheaply to form reservoirs.

Floating ways are prepared by blasting rocks in the beds of streams, building wooden troughs, facing the banks, etc.: floating channels (flumes) secure a tolerably equal depth of water throughout the course;

and by many other devices the work of floating is economically and regularly maintained. This may best be realised by considering that before the floating ways were regulated logs might be two or even three summers on their way to the sawmills, while now they cover the distance in one summer. The loss of timber in floating is less than 1 per cent. in some Norrland rivers. Although many men are employed in the hazardous work connected with timber-floating, fatal accidents are rare. There are no uniform figures as to the quantities of timber floated down Sweden's 18,000 miles of floating ways, but in 1912 Norrland, Dalarne, and Värmland accounted for 90 million logs.

After passing through the sorting-booms, the logs are hauled up inclined planes to the sawmills whence they emerge as boards or deals, to be classified for export, as is shown in the table.

Sweden's Exports of Unwrought, Hewn, and Sawn Timber, according to Kind, 1912.

Kinds of Goods.	Cubic Feet (Thousands).	Kinds of Goods.	Cubic Feet (Thousands).
Timber and masts,	875	Fuel-wood,	1,095
Spars and small timber,	5,597	Deals, battens, and boards, unplaned,	142,139
Beams or balks,	1,467	Planed boards,	23,177
Rafters,	11,608	Deal and board ends,	10,710
Pit-props,	15,548	Other kinds,	2,774
Sleepers,	2,864		
Staves,	4,547		

Of this total export the United Kingdom took over 34 per cent., France and the German Empire coming next with 14 per cent. each. Of the pit-props almost 97 per cent. came to the United Kingdom. This branch of the timber industry has long been regarded with some ill-will or suspicion by the Swedes, due to an apparently not unfounded fear of forest exhaustion by ruthless cutting of young trees.

The waste of the sawmills is utilised in the preparation of wood-pulp, charcoal, and tar. Charcoal is largely used in the iron and steel industry; much of the tar is exported.

Timber Industries, 1912.

Mill, Factory, etc., Kind.	Number.	Number of Workers.	Output in £1000's[1]
Saw and wood-planing,	1,248	37,908	9,675
Wood-pulp,	167	13,910	6,430
Match,	18	6,592	921
Joinery and Furniture,	565	10,464	1,713
Cooperies,	38	422	85
Wooden Shoes,	45	400	68
Chip-boxes,	6	170	33
Paper,	73	8,609	3,563
Paper Manufactures,	171	4,441	765
Charcoal,	407	6,639	709

[1] Converted from kroner (18 kr. = £1.)

As the timber industries of Sweden are closely related to the distribution of its vast supplies of water-power, some account of these may not be out of place.

Sweden's total available water-power is computed at 6·2 million turbine horse-power, which can be utilised for about nine months in the year. Estimates on the same basis for other European countries show that this figure is exceeded only by Norway (7·5), while Great Britain is almost at the foot of the list (1·0). As in other countries Sweden's water power is found in the less accessible parts of the country where population is sparse, communications lacking, and industrial prospects relatively poor. These inter-related disadvantages are partly neutralised by methods of transmitting energy over long distances from the source of power, and it has been calculated that, of the total existing water-power, 3·5 million turbine horse power, or over 56 per cent., can, with suitable regulation of the lakes, be utilised with profit. Of this utilisable total about 750,000 turbine horse-power (21 per cent.) is now equipped. The accompanying table shows, by percentage of the available water-power in each district, how geographical situation determines utilisation.

Relation of Utilised to Available Water-power, 1913.

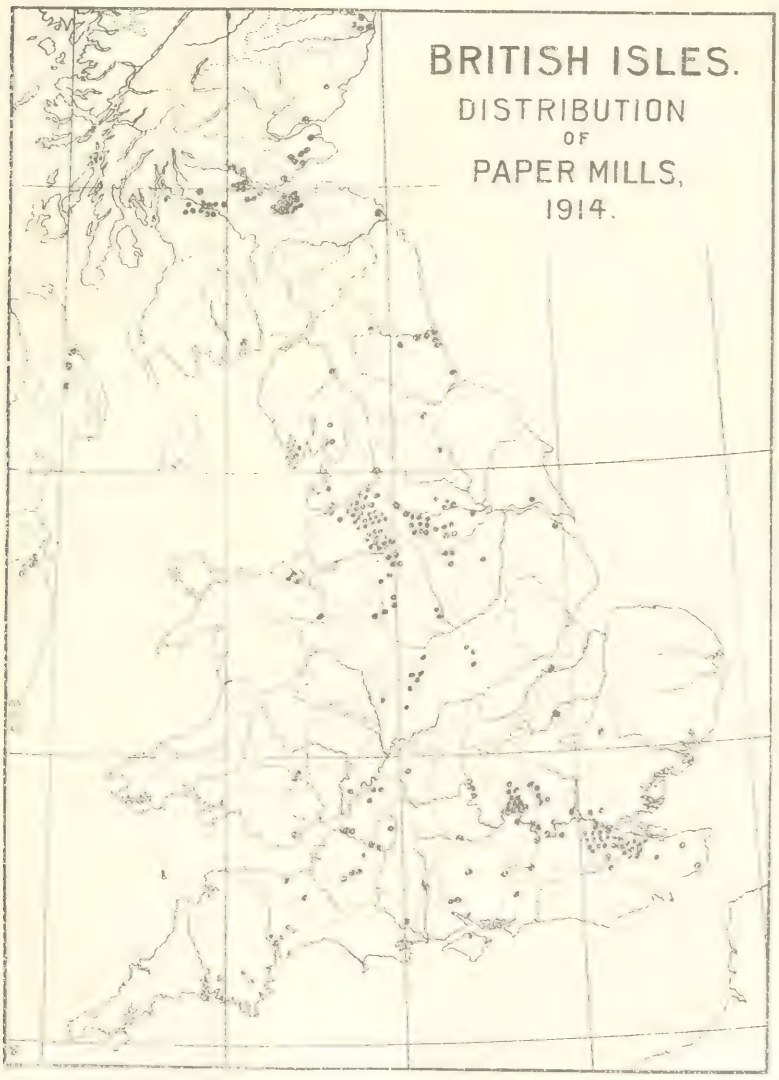
Central Sweden, . . .	74·0 per cent.
South-East Sweden, . .	29·0 ,,
Skane, ...	13·5 ,,
West Sweden, . . .	40·0 ,,
Lower Norrland and Dalarne,	12·5 ,,
Upper Norrland, . . .	2·7 ,,

The percentage of water-power used directly to that used indirectly (*i.e.* transmitted as electricity) was 36 in 1912, and it is certain that this disproportion will diminish still further in the near future. Sweden's poverty in coal in conjunction with the destructive consumption of wood for power, forces the question of water power on the Government. Of the total power used in 1912, 63 per cent. was water-power: as a result of State activity in the establishment of electric water-power plant, this percentage must steadily increase. The reader will appreciate the relation of this section to the war conditions affecting British coal export (which normally forms about one-third of our total exports of raw materials to Sweden) and freights. In relation to our immediate subject it may be noted that of the 750,000 turbine horse-power utilised, 32 per cent. is consumed by paper and pulp industries against 29 per cent. by the iron industry.

Wood-pulp accounts for about 12 per cent. of the total export trade of Sweden. This industry dates from 1857 when a wood-grinding mill was erected at Trollhattan where the Gota river escapes from Lake Vener. This is the region in which water-power has been most largely harnessed. Wood pulp is prepared by three principal methods, one mechanical, the other two chemical.

In the mechanical process, blocks of wood are ground against sandstone grindstones, the whole being kept constantly supplied with water.

In some mills the wood is first steam-boiled, and then either ground or defibrated by some other means. Most of the mechanical pulp is made from spruce, but aspen is used for a specially white, resin-free product.



(Prepared from information in the *Directory of Paper Makers*, 1914.)

Fir is employed to a small extent in brown pulp. Of the total number of wood-pulp mills about 100 use this mechanical process: the output is valued at about £1,000,000.

The earliest chemical wood-pulp was prepared by the soda or sulphate

method, in which chips of wood are boiled under pressure in caustic soda-lye. Sodium sulphate[1] is now the chemical principally used, because it gives a larger output of cellulose. Spruce and fir are both used in the sulphate factories. The pulp is brown in colour, and is employed chiefly in the manufacture of natural-colour papers. For finer papers bleaching is necessary, and three sulphate factories have large bleaching establishments for this purpose. There are twenty-one sulphate cellulose factories producing annually to the value of about £90,000.

By far the greatest amount of pulp is now prepared by the sulphite method, in which calcium bisulphite is the solvent most employed. Spruce wood is almost exclusively used, and the pulp (cellulose), being fairly white, can be used without bleaching for the cheaper writing and printing papers. At present there are some sixty-five sulphite factories with an output valued at about £4,700,000. Among the by-products of the chemical factories are turpentine, resin, and sulphite spirit—chiefly methyl alcohol.

All these pulps are exported either "wet" (with 40-50 per cent. of moisture), or "dry" (10 per cent. moisture), but it is chiefly "wet" mechanical pulp that is exported, while the bulk of the chemical export is "dry." "Dry" pulp is prepared to avoid mildewing, and to reduce sea freight and other transport charges.[2]

The economic importance to Sweden of this wood-pulp industry is that it utilises the timber waste of the sawmills[3] as well as timber cut for the thinning of forests. In the latter respect it seems to encourage scientific forestry. The industry centres in Värmland, Västernorrland, and Gefleborg, which produce half of the total for the country.

The decreasing import of wood-pulp into the United Kingdom owing to the war shows how the industries of a neutral country may be affected. The decrease is due to a lessened production which is explained by Sweden's difficulty in obtaining coal and chemicals for the industry, as well as by the higher wages, freights, and insurance she has to pay. Thus for some kinds of wood-pulp prices have risen over 100 per cent., and supplies can hardly be obtained. The distribution of paper mills in the British Isles is shown in the accompanying map.

Paper-making scarcely holds the position that consideration of the wood-pulp industry would suggest. This is partly owing to the absence of coal in Sweden. Yet Sweden exports large quantities of two classes of paper in which cheapness is of prime importance. These are newspaper paper (over £500,000 in value), and fine and coarse wrapping-paper (over £1,000,000 in value).[4]

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1 Sodium sulphate has no action whatever on wood, but, when the waste liquors are recovered by concentrating and roasting, the sulphate is changed to sulphide and carbonate, both of which are effective agents in boiling.

2 *Journal of the Swedish Chamber of Commerce in London.* "Special Wood Pulp Issue," December 1915.

3 The relative quantity of saw-mill waste used in the pulp industry is very small, and this waste can be put only into the lowest grades of pulp.

4 I am indebted to the chemist of a large Scottish paper mill for revising, and writing the footnotes to, the part of this article dealing with wood-pulp.

One of the most interesting of Sweden's forest industries is equally related to timber and to chemistry. But because the match industry sprang from the forest wealth (aspen wood) it is usually described under the timber industries. The famous safety matches, with the Arabian Nights' Shibboleth on the box ("Jönköpings säkerhetständstickor"), were first made at Jönköping in 1852. The success of the industry depends upon the extensive use of labour-saving machinery. The machine in use at present turns out some 66,000 packed boxes in a working day of ten hours. The further development of this industry is practically arrested by the high tariffs abroad, and the State monopolies of match-manufacture in *e.g.* France and Spain. About 37 per cent. of the export comes to the United Kingdom, frequently packed in other wood manufactures, *e.g.* coffins, to lower cost of transport.

From the joinery factories the United Kingdom imports large quantities of house-fittings, *e.g.* doors and window-frames, so that we build our houses, schools, etc., round these. Many complete wooden summer-houses are also exported. The quantities of planed deals, packing-case material, staves, etc., exported to this country amount to over 50 per cent. of the total export. Most of the carpentry products depend upon the plentiful supply of cheap oak, birch, alder, and white wood.

In Sweden, where geographical extension is accompanied by sparseness of population, and where food-stuffs have to be carried to the outlying parts whence raw materials are derived, communications are an important consideration. They determine the price of imported food in outlying districts, and the cost of transport of native products which must be taken expeditiously to centres of manufacture or export. Similarly, a mercantile marine is necessary for foreign trade in bulky commodities, and the carrying trade must help to pay for Sweden's adverse trade balance. As has been indicated, the northern ports alone are icebound in winter: in the south the time during which shipping is held up by ice is growing shorter—*i.e.*, the advent of steamships and ice-breakers has made ice-obstruction less formidable.

With a long coastline on an almost tideless and stormless sea, into which several lakes open, and from which many fiords, navigable waterways, and canals extend inland, Sweden has many deep-water harbours protected by natural or artificial means. The most important seaports (in order of total tonnage entering and leaving, 1910) are Stockholm, Gothenburg, Malmö, Helsingborg, Trelleborg, Luleå, Gefle, Sundsvall, Axelösund, Kalmar, Norrköping, and Landskrona.

Sweden's railway lines, stretching for nearly 9000 miles (1913), give over 16 miles per 10,000 inhabitants. From this point of view Sweden is the best provided of European countries, Denmark coming next with little more than half that mileage, and the United Kingdom holding sixth place with about 8 miles.[1] The greatest network lies in the south, but a main line runs north near the coast, with extensions across the frontier to Trondhjem and Narvik, and branches to the chief towns

[1] Note, however, that by this criterion Argentina, Australia, and Canada would head the world's list. Cf. H. Key, *La Vie Economique de la Suède*, p. 124 (note).

along the Bothnian coast. Of the total length of railways more than half are run by private companies. There are steam railway ferries between Malmö and Copenhagen, and between Trelleborg and Sassnitz (Rügen Island). For reasons that are patent, Sweden is proceeding with the electrification of her railways. Naturally this has been done first in the large cities of the south, especially Stockholm and Gothenburg. The first electric State line stretches between Kiruna and Riksgränsen (about 60 miles). This section was selected because it has the largest regular traffic of the State system, and owing to the increased output of Gellivara ores, a further increase of traffic must be provided for. Power to drive this line is developed from the Porjus waterfalls in the upper Lule river.

Imports into United Kingdom (1912).[1]

	Total Value (£1000).	Per cent. of each total from Sweden.
Raw Materials, etc. Total import,	275,668	2·4
Of which—Wood and Timber,	28,357	13·9
Paper-making materials,	5,567	40·5
Manufactured Goods, etc. Total import,	185,467	2·2
Of which—Manufactures of Wood and Timber,	2,874	6·9
Paper, etc.,	7,234	19·5

The returns for 1912 have been selected for comparison with the tables in the Swedish Handbook. It will be noted that while Sweden's share in our total imports is small, her contributions to the commodities derived from forest products are far from being negligible. From the accompanying more detailed summary of her exports to the United Kingdom, the predominant part played by forest products in Sweden's trade is strikingly shown.

Swedish Exports to United Kingdom (1912).[1]

	Total Value (£1000).	Forest Products. Per cent. of each total.
A Food, etc.,	2,522	...
B Raw Materials,	6,690	93
C Manufactured articles, etc.,	4,011	47
D Miscellaneous,	13	...

Keeping these totals before us we may proceed to indicate the forest products that we have included in classes B and C.

[1] Figures from "Annual Statement of the Trade of the United Kingdom."

Swedish Exports to United Kingdom—Forest Products (1912.) [1]

	Value in thousand £.	Percentage of Total Value.
	£	%
B Raw Materials. Total,	6,189	(100)
Of which—Wood pulp,	2,256	36
Wood and timber, hewn,	550	9
,, ,, sawn or split, planed or dressed, and sleepers,	3,276	53
Wood and Timber, Staves of all dimensions,	107	2
C Manufactured articles, etc. Total,	1,886	(100)
Of which Matches,	273	14·5
Paper and Manufactures,	1,410	74·7
Wood and Manufactures,	197	10·5
Carriages, etc.,	6	·3

Forest products represented 61 per cent. of the value of Swedish exports to this country. Finally, the part that forest products played in Sweden's total foreign trade is shown in the table below.

Swedish Exports according to Production Groups (1912).

	Value in thousand £ (18 Kr. £1).	Percentage.
	£	%
Products of agriculture, dairying, etc.,	7,258	17·2
,, forestry and the timber industry,	10,706	25·3
,, the sewing and textile industry,	529	1·2
,, the paper industry,	7,593	18·0
Minerals and products thereof (except metals),	6,430	15·2
Metals and products thereof,	8,821	20·9
Products of other industries,	920	2·2
Totals,	42,257	100·0

From this table it will be seen that what we have described as forest products form by far the most important part of Sweden's foreign trade.[2]

There seems to be an interesting contrast between Swedish and Canadian forest industries. In the March number of the *S.G.M.* Mr. Cadell shows how Canada is exhausting her resources; but in Sweden the general tone of the Official Handbook is also found in Dr. Key's little volume: "Nous pouvons dire que la base du développement économique de la Suède est très saine à l'heure actuelle."[3] J. H. BIRRELL.

[1] Figures from "Annual Statement of the Trades of the United Kingdom."

[2] See *La Vie Economique de la Suède*, chapter xi., where Dr. Key shows that in the decennial period 1900-1910, "La valeur totale de l'exportation du bois, de la pâte à papier et des articles en papier a été presque trois fois supérieure à celle de l'exportation du fer, de l'acier et du minerai de fer."

[3] *Ibid.*, p. 161.

THE SHACKLETON ANTARCTIC EXPEDITION.

SOMEWHAT unfavourable news in regard to this expedition came to hand in March, when a wireless message was received from the *Aurora*, the Ross Sea ship. It appears that during a very severe gale in May 1915 the ship broke loose from her moorings and drifted with the ice to the north. Her rudder was crushed in July, and she did not escape from the pack till March 14, 1916, when she was in lat. 64° 30′ S., long. 161° E. She reached New Zealand on April 3 in a badly damaged condition. At the time when she broke away, three parties, including Captain Mackintosh, were on shore at the Ross Sea base, near Cape Evans, and were unable to rejoin the ship.

The *Daily Chronicle* published on April 4 a lengthy dispatch containing the results of an interview with Lieutenant Stenhouse, the master of the *Aurora*, and from this we quote the following extracts, which summarise the chief incidents of the period of drifting and the events which preceded the breaking loose of the ship.

The *Aurora* left Hobart on December 24, 1914. After embarking twenty-five sledging dogs from Taroona station, with two members of the party who had been looking after the animals, she proceeded south to Macquarie Island, which was reached on December 30. After landing sheep, poultry and stores for the people at the wireless station, the ship left on the following day, and had a fine run down to the south. The first iceberg was sighted in lat. 62° 40′ S., long. 169° 58′ E., and the first line of narrow stream ice was passed through in lat. 64° 27′ S., long. 171° 49′ E. Thence onward detached bergs and "growlers" were continuously encountered. Mount Sabine was sighted early on January 7, 1915.

The party found the Ross Sea fairly clear of ice, and the ship arrived off Cape Crozier on January 9, after a record short passage of sixteen days. Here the wintering party, who were to consist of Stenhouse, Cope and Spencer-Smith, accompanied by some of the others, went ashore to endeavour to find a landing-place for the stores, which were to be placed in the hut there, in order to facilitate the projected winter journey from the base in M'Murdo Sound. No landing, however, could be effected, owing to the advancement of the Barrier ice along the high Crozier cliffs, and the party returned to the ship.

Proceeding towards the entrance to M'Murdo Sound, thirty miles west of Cape Crozier, they were held up by the pack ice until January 16, when a landing was effected at Cape Evans. Captain Mackintosh also landed, and Joyce, Stevens and Spencer-Smith proceeded to Scott's Hut. They returned, after making a survey of the hut, and the ship then proceeded south and west to Inaccessible Inlet, in the endeavour to reach Hut Point (the *Discovery's* old winter quarters), from which depôt-laying parties intended to start.

On the next day stores were landed at Cape Evans. On January 18 a party, consisting of Stenhouse, Joyce, Hayward, Stevens and Gaze, travelled over the sea ice to Hut Point in order to make an inventory of

the stores which had been left there by the previous expedition. They found the hut snowed up, but they managed to make an entrance through the window. They returned to the ship on January 21. On January 24 the first depôt-laying party, consisting of Joyce, Gaze and Jack, set out for the Minna Bluff depôt. On January 25 Captain Mackintosh, with Wild and Spencer-Smith, started with nine dogs for the Mount Hooper depôt, ninety miles south of the Bluff, or 175 miles from Hut Point. On January 31 the third depôt-laying party, composed of Cope, Stevens, Richards, Hooke, Ninnis and Hayward, left for the south. They had with them the motor tractor, towing two sledges, while another sledge was hauled. This party returned to the ship the following day, having made a depôt of two of the sledges and left the motor, which gave trouble near Hut Point. Captain Mackintosh had left a note at the hut stating that travelling to the Barrier was very difficult, and that he had returned on account of bad weather on the sea ice. He had then proceeded south again, leaving instructions regarding a safe course to the Barrier across the sea ice.

Cope's party reported that Joyce and his companions were in difficulties off Cape Armitage, on rotten sea ice, one member of that party having returned to the Discovery Hut as informant of the danger. On the evening of February 3 Lieutenant Stenhouse pushed the ship into the breaking pack and picked up the depôts of the third party. The ice being safe on February 5, the third party again left the ship for Minna Bluff, *viâ* Hut Point. The ship hung on the edge of the sea ice, four miles north of Hut Point, awaiting signals showing that the party had arrived there safely. No signals were, however, seen. On February 7 the *Aurora* proceeded to Cape Evans to make soundings for a winter anchorage. A fresh northerly gale, which was blowing and driving small ice into the bay, rendered boat work, shorthanded as they were, impracticable, and it was decided not to lay moorings at Cape Evans, but to endeavour, according to directions, to winter the ship at Glacier Tongue. Strict instructions had been given to Lieutenant Stenhouse by Captain Mackintosh, that on no account was he to attempt to winter at Hut Point. The ship was held up, but on February 18 it proceeded to the south side of the Tongue to procure water. During the time she was held up continual blizzards prevailed, and the *Aurora* was at the mercy of the wind and ice. While watering the ship the southerly wind increased, and the ice pressed her against the Glacier Tongue, so she had to leave for the open Sound again. The attempt to hang near the Tongue had to be given up owing to the danger from the pack ice, and the *Aurora* proceeded to Cape Evans and dropped anchor off Scott's Hut. Ever since the ship had entered the Sound there had been a succession of blizzards and much ice.

On March 10 the anchor dragged and the ship set close to the glacier in the blizzard and narrowly escaped destruction, drifting thirty miles to the north-west. The wind moderated during the night, and the *Aurora* steamed towards Hut Point, and anchored in Discovery Bay. During the forenoon of March 11 two months' full provisions for twelve men were put ashore for the parties who were still away. That con-

sisting of Spencer-Smith, Stevens, Hooke, Ninnis, Richards, and Gaze was embarked. They had returned from the Bluff locality, alterations having been made in the parties, so that Mackintosh, Wild, and Joyce were to proceed to Mount Hooper, and Cope, Hayward, and Jack to the Bluff. The ship then returned to Cape Evans. Young ice was forming, and the days were rapidly drawing in. At six o'clock on the morning of March 12, when the *Aurora* was anchored off the Cape, the blizzard, blowing with increasing violence, caused the anchors to drag, and the ship was again swept dangerously close to Cape Barne and Cape Royds. She was driven by the wind, which had increased to storm force, to the neighbourhood of Beaufort Island, forty miles from her anchorage, during the night.

The weather moderated on March 13, and the *Aurora* again returned to her anchorage at Cape Evans. Young ice covered the Sound and made it extremely difficult to manœuvre the ship. A party consisting of Stevens, Spencer-Smith, Gaze, and Richards took up their quarters in the hut on March 23 to carry on scientific work. During the whole of this time until the final breaking away the ice was continually forming, setting out from the bay and returning as an over riding pack, so that the ship could not shift her position. During a particularly heavy wind a berg near the end of the Cape capsized and caused a tremendous sea, which washed away some coal and a number of cases of oil from the deck. The *Aurora* was continually dragging her anchors under the influence of the ice. The wind alone would not have caused any danger, for her moorings were more than sufficient to hold her against the wind.

The provisions landed at the Hut for the use of the shore party were approximately sufficient for two months. But the stores left by the Scott Expedition at Cape Evans are ample for all the shore parties' needs. No fears need be entertained for the food supplies of those left behind. The other stores at Hut Point, including the new depôt, provide provisions for four months in all. There are large colonies of seals in the vicinity, and all the huts had their available storage filled with blubber and meat. A profusion of provisions is to be found at Cape Royds, sufficient to support twelve men for eighteen months. Clothing and fuel are limited, but can, with resourcefulness, be made to last until relief reaches the men next year. There need be no fear of scurvy, seals, penguins, and gulls supplying plenty of fresh meat.

By March 20, the ice being fairly firm round the ship, steam was shut down in the main engines and fires drawn. All the sledging rations had been put on shore, but, as previously arranged, the following season's winter clothing was still on board, for it was proposed to make the ship the winter headquarters. On March 26 some very heavy over-riding ice sheets that were driven into the bay caused the *Aurora* to drag her anchors and to touch ground aft. During the whole of their stay at Cape Evans, constant vigilance was required in looking after the moorings and trying to keep the ship in position amid the moving and uncertain ice-sheet. On April 14 Lieutenant Stenhouse, owing to the continued absence of the southern parties, consisting of Captain Mackin-

tosh, Joyce, Wild, Cope, Jack, and Hayward, decided to send a search party out over the sea ice to Hutton Cliffs. The sea ice was now safe to travel on to the south from Cape Evans. The party consisted of Ninnis, Hooke, and Gaze, the first-named being in charge. He received instructions from Lieutenant Stenhouse to proceed to Hut Point with provisions to last three men a week, and with four gallons of oil, sufficient for three men for forty days. The surplus oil was to be deposited at Hut Point.

It was arranged that if, on arrival at Hut Point, the search party discovered no traces of the parties that had gone south, Ninnis was to take rations for twenty-one days, and proceed with Hooke and Gaze to Corner Camp. If nothing was to be seen of them there he was to return to the ship at once. As the sea ice around Cape Evans was treacherous, a rope ladder was lowered from the sledge depot to the sea ice, and a sledge ready provisioned was hauled overland from the depôts at the foot of the ice in readiness for the relief dash. A depôt marked by a flag was laid down three miles south in the direction of Hut Point, with instructions for the safe ascent of the ice cliffs should a party return before the search party reached them. Bad weather prevented the despatch of any party during the stay of the ship at Cape Evans, which should account also for the non-return of Captain Mackintosh's party from Hut Point.

Signals had been arranged which were to be shown from Observation Hill at nine o'clock every evening when conditions were favourable. With the fall in the temperature, the ice surrounding the ship became firmer, and consequently each subsequent blizzard in driving the ice from the Sound threw a terrible strain upon the ship and her moorings. The ice pressures became heavier and alarming, but hopes were still entertained of an ultimate freeze-in.

On April 23 the sun disappeared. Constant blizzards continued to blow with increasing violence. By May 6 heavy ice had formed round the ship, and the prospects of a final freeze up seemed very favourable. Then a blizzard of terrific violence, accompanied by an enormous volume of drift, blew the ice from the shore junctions. The ship held about two square miles of ice against her moorings for several hours, but at 9.30 P.M. all the moorings parted. The bow anchors went, and the *Aurora* was swept out in the rapidly breaking up pack to the north-west of M'Murdo Sound. Prompt measures were taken to ensure the safety of the ship to the height of the rails, and the sea-cocks became frozen up. Great difficulty was experienced in getting water for the boilers.

On May 8 Cape Bird was sighted and Cape Barne was visible, the heavy pressure taking the ship to the harbour side. The wireless aerials were sent aloft on May 8, the mast having been fitted the day the ship broke adrift. About this time very severe blizzards were experienced, after which there was normal weather for two months. Towards the end of the month the sledges were prepared in case it became necessary to leave the ship. There was tremendous ice pressure at this time.

Mount Melbourne, ninety miles to the north, was sighted on May

27, and Emperor penguins passed close to the ship and made a welcome addition to the larder. The ship drifted steadily outwards, and in lat. 76° went to the east at a greatly increased rate. Franklin Island was passed twenty miles to the north, and the ship then set north-eastward. During the whole of this time the free ice appeared to be eastward, which would indicate that the Ross Sea was open. On June 5, the prospect of a speedy release was revived by the sight of a broad "lead" east and north, showing that there was open water in that direction. The weather became more violent during July and the pressure noises increased. On Sunday, July 18, the ice shook and opened a broad lane. Two days later Emperor penguins were seen, the nearest land being ninety miles to the westward. On the 21st the lanes opened and the ship swung athwart. Heavy floes 10 feet thick, closed in again, rubbing the vessel bow and stem. The force must have been tremendous, for the steel-bound rudder, weighing six tons, was bent over to starboard and twisted like a corkscrew. The ship survived the pressure, though she rose amidships in a concertina motion, and they thought the end of her had come. On July 22 the terrific pressure raised the ship half on to the ice. All hands were called to their stations for the sledges, and final preparations were made for abandoning the ship.

The sun returned on August 6, the *Aurora* then being forty five miles east of Possession Island. A seal was killed on this day, and furnished a very welcome supply of fresh meat. Provisions were low, and only two meals a day were served. From then onward the main diet consisted of penguin and seal meat. The ship passed close to Cape Adare on August 19, and then set slowly north-west. Sturge Island and Balleny Island were sighted as they drifted north-west past Cape North. A terrific blizzard raged on September 5 and the mizzen wireless mast was carried away. They, however, rigged another aerial, and continued to send messages. Distant land was again sighted on September 14, and, the drift still continuing to the north-west, by early October land was seen to the south-west. This by observations was identified with Mates Land.

Records of biological interest were made, ice formations examined, and soundings taken. On November 17 a sounding of 180 fathoms was taken, the bottom being muddy. Land was again sighted at the end of November to the north west. An Emperor penguin, which probably breaks the record for size, was captured on December 10. It weighed 95 lbs. Numerous specimens of Antarctic life were obtained during the long drift, which should prove of great interest and value. At Christmas extraordinary ice thicknesses were observed in the lanes near the ship. In some places the ice extended 25 feet to 30 feet below the surface, this being caused by the under-riding floes. The ice conditions continued to improve, and as the ship gradually drifted northward the lanes became more open and more numerous, and there was much ice movement, bergs being frequently in sight. At last, on February 12, the ice round the ship broke up, and she was able to sail slowly to the northward. On March 10 she had a narrow escape of being crushed between bergs. After passing through heavy pack the *Aurora*, as already stated, cleared the ice on March 14.

Up to the time of going to press no news had come to hand of the *Endurance* or of the Weddell Sea party, and it is feared that the conditions may have been very unfavourable in that quadrant also.

GEOGRAPHICAL NOTES.

EUROPE.

Italy and the Adriatic.—Paolo Revelli contributes to the *Rivista Geografica Italiana* for February-March an article on the Adriatic and the control of the Eastern Mediterranean. He begins by adopting a statement of Cassi's, that two fundamental anthropogeographical laws can be deduced from the history of the Adriatic region. These are that civilising influences have always tended to flow from the western shore—characterised by its ease of access to the interior—towards the eastern shore, which is all but cut off, owing to the nature of the topography, from the hinterland beyond. On the other hand, the ease with which piracy and raiding can be carried on from the eastern shore towards the west has always tended to make that shore inhabited chiefly by military colonies, or temporary groups of people. In the second place, the control of the Adriatic involves the control of the eastern Mediterranean and of the traffic to the east. The paper itself consists of a somewhat detailed study of the history of the region round the Adriatic, with a view to showing that these "laws" have exerted influence at all stages, but the essential point of the article appears to be that Austria's numerous naval bases on the eastern Adriatic, and the air raids which her forces have carried out on the Italian cities during the war, indicate that as a power on that shore she is the successor of the pirates of an earlier day, and that her object there, in creating an appearance of industry and prosperity in Bosnia-Herzegovina, in constructing railways and so forth, is but to conceal as far as may be the Pan-Germanic hope of obtaining the mastery of the Eastern Mediterranean, and the control of the trade to the East. Signor Revelli holds that the numerous monuments of an earlier Latin civilisation along the eastern coast of the Adriatic, and the Italian influence which at the present time, he says, is strong out of all proportion to the actual number of persons of Italian race, proves that this shore should be Italian, and he believes that the more cultivated Slavs in Dalmatia would admit the strength of the Italian claim. The Italian claim he considers to be strengthened by the number of Italians which live round the coasts of the Eastern Mediterranean and the Black Sea, whom he estimates at 90,000 at the time of the outbreak of the Italo-Turkish war. Only by holding both shores of the Adriatic can the Italians hope to acquire a secure position in the seas further east. In its historical section the paper contains a somewhat detailed discussion of recent politics in the Mediterranean, which includes, among other interesting points, the statement that Austria wished to annex Albania no less than Bosnia-Herzegovina, and

a discussion of the ways in which the traffic of Central Europe has been more and more directed upon Trieste instead of upon Venice, which from its relation to the Brenner route would seem to be the natural outlet.

A quite similar subject is discussed, from the point of view of the Southern Slavs, in an article by Sir Arthur Evans which appears in the *Geographical Journal* for April. This article deals especially with what the author calls the Dinaric Triangle, that is the area lying between the Adriatic, the Drave to its confluence with the Middle Danube, and, to the east, the river Drina. Sir Arthur Evans' position is that the main avenue of communication for this tract from west to east has always been the Save valley, and always must be this valley. According to him, the power which holds the valleys of the Drave and the Save has the best chance of controlling eventually not only the mountainous interior of Bosnia and Herzegovina, but the maritime region of Dalmatia, to which the lateral valleys of the Dinaric Alps afford many points of access. He believes that the attempt to hold the mountains from the sea front is doomed sooner or later to failure: while, at the same time, to attempt to hold the sea front without the mountains is an equally precarious endeavour, the more so in face of the racial bonds that now bind together the whole area. For him the Dinaric region is one and indivisible from the great rivers to the sea. He believes that the existence of an united South Slavonic State would be the only power capable of offering a solid bulwark against German or Austro-German dominion in the region, and that the existence of such a power could be reconciled with Italian interests. The boundary which he suggests would give Italy Trieste and a maritime strip extending thence to Pola, as well as the islands of Lussin and Cherso, but would include the whole of the Dalmatian coastline and the remaining islands, together with most of Istria, in the great South Slavonic state, which would thus possess the important port of Fiume. It is obvious that there is a considerable discrepancy between the two points of view, the Italian and the South Slav.

Asia.

Russian Central Asia.—Professor M. Friedrichsen contributes to *Petermann's Mitteilungen* for November and December last an article on this subject. The article on the whole does not contain much that is new, but the account of the composition of the population, and of the modes of soil utilisation is interesting, and the sections on the political and military geography of the region contain some striking admissions.

Russian Central Asia consists of Russian Turkestan and of the partially independent states of Bukhara and Khiva. The original population was Iranian, but as the region lies on the highway of migration of Turko-Tatar hordes from Central Asia into Asia Minor and Europe, there has been a great intermixture of races. Broadly speaking, the Turko-Tatar elements are pastoral nomads, and the peoples of Iranian stocks either town dwellers, and then busied with minor manufactures

and arts, or sedentary agriculturists. The incoming nomads were, till the advent of the Russian, the dominant race, but, wherever the conditions permit of agriculture, which is especially on the mountain fringe, they tend to adopt the mode of life of the indigenous groups, and to mingle to a greater or less extent with them. Much of the region is of course desert, only fitted for pastoral nomads, but at the bases of the surrounding mountains there are thick deposits of loess, and this, here as in China, is extraordinarily fertile, if it is sufficiently watered by nature or is capable of irrigation. The loess belt, therefore, tends to be densely peopled by sedentary agriculturists, while the wide deserts of the centre are scantily peopled by nomads.

Russians have only entered the country in small numbers, as officials, soldiers, and, to a small extent, as merchants and planters. In a population of over 9,000,000 they seem to number only some 300,000. The rest of the population can be divided into four chief groups. The first is that of the Tadjiks and Galtchas, who have kept the Persian tongue, and are of almost pure Persian blood. They are sedentary agriculturists. The second group, that of the Sarts and Uzbegs, is of very mixed origin, showing all transitions from the pure Iranian type to apparently pure Mongolians, with the characteristic slanting eyes. Sart merely means townsman, in opposition to nomad, and the Sarts form the chief element in the towns. They are Mohammedans, and speak a kind of Turkish. The Uzbegs form the greater part of the population of Khiva and Bukhara, and though they have kept the name of a Turkish tribe, show a strong admixture of Persian blood. The nomads fall into the two groups of the Kirghiz and the Turcomans. The Kirghiz speak Turkish and are of pure Mongolian type. The Kara-Kirghiz, or Black Kirghiz, are mountain-dwellers, inhabiting the Pamir-Alai and the Tian Shan, and wandering from upper to lower pastures and back again with the changing seasons. Their wealth consists in their flocks of sheep and horses, and owing to their habitat they show little admixture of blood, and no tendency to abandon their migratory life. The Kasak Kirghiz, or wandering Kirghiz, inhabit the steppe and desert regions of the Aralo-Caspian depression, and because of their proximity to the agriculturists of the oases, show a tendency both to intermingle with these and also to abandon their ancestral nomadism in favour of the sedentary life. The Turcomans not long ago were pure nomads, though there is considerable admixture with Iranian stocks, and they used to add to their nomadism, as is not infrequent with Central Asiatic tribes, the trade of robber. Since the Russian occupation they are tending more and more to become settled on the land, and live in numbers between Khiva and the Caspian, round Merv, and elsewhere.

The above description shows that in this part of Asia an original agricultural population, relatively few in numbers, was partially overwhelmed by incoming nomads, who, however, after their first military successes, became to a considerable extent absorbed by the indigenous race. The process of "denomadisation," as one may call it, has been greatly accentuated since the coming of the Russians. An explanation of these various historical facts is furnished by the following figures a-

to the amount of cultivated land. Of the total area of some three and three-quarter million square miles, only about three per cent. is cultivated, leaving obviously large areas for the pastoral nomads. But of this small total some 90 per cent. requires artificial watering, and the Russian government is devoting much attention to irrigation questions. It is believed that the present area fit for cultivation can be nearly doubled. Vast areas in the interior are, however, destined to remain suitable only for migratory herdsmen, and in the whole of the centre cultivation can only be carried on to any considerable extent in the Khiva region, that is, round the lower course of the Amu Daria. But at the foot of the Kopet Dagh, on the western Tian Shan and Pamir-Alai, as well as at the edge of the Fergana basin, that is, on the loess zone generally, there is a broad belt of cultivated land, where all the usual cereals, also pulse, sesame, poppy, flax, hemp, many kinds of vegetables, lucerne, cotton, cucumbers, melons, etc., tobacco, and all the sub-tropical fruit trees, are cultivated. The cereal production scarcely supplies local needs, but fruit, including grapes, is extensively exported to European Russia. Special efforts, some of which have been stopped by the war, are being made by the administration to develop cotton-growing and silk production. Further, the Sarts work up the local raw material into a variety of highly artistic goods, the leather and metal industries being noteworthy. It is interesting to learn that both the climate, which involves the risk of malaria, and the specialised care required for the cultivated plants, make Turkestan unsuitable for the Russian peasant, who does not settle here as he does in Siberia. On the other hand, in the region of the northern slopes of the Tian Shan, where artificial watering is not necessary, and the climate is somewhat different, Russian peasants are much more at home, and are present in much greater numbers.

In the section devoted to military geography, we need only note that Professor Friedrichsen considers that there is little probability that the declaration of the "Holy War" will make much impression in Turkestan, despite the size of the Mahommedan population. He states that news from Asia is scarce, but that it may be expected that India, Afghanistan, as well as "hesitating Persia," have declared the Holy War, and that in that case a conflagration may also occur in Turkestan, but he believes that for a variety of reasons the cause is unlikely to meet with great support there.

POLAR.

Expedition to North Pole.—It is announced that Captain Roald Amundsen is going on with the arrangements for a North Polar Expedition which he suspended at the outbreak of the war. The Storthing had previously voted £12,000 towards the expenses of the expedition, but Captain Amundsen did not accept the money in view of the special circumstances. Now, however, he is beginning to make arrangements for next summer. He proposes to leave Point Barrow, North Alaska, and to drive with the ice over the Polar basin.

Mr. Knud Rasmussen's Expedition.—In regard to Mr. Knud Rasmussen's plans for the exploration of Northern Greenland, of which mention was made here on p. 199, it appears that the start was made later than was originally contemplated, and this makes it doubtful whether the explorer will be able to reach his station at Thule, in North-West Greenland, in time to reach the unknown country joining Peary Land to the main body of Greenland this year. He still hopes to be able to do so, and to add to the value of the exploration he has arranged to take with him a Danish geologist, Mr. Lange Koch, as well as his manager at Thule, Mr. Peter Freuchen, who is a skilled surveyor. If, however, Thule is reached too late in the season to admit of the original plan being carried out, Mr. Rasmussen intends to devote the season's work to a systematic examination of the shores of Melville Bay. He believes that valuable evidence about the Eskimo migrations is to be found there, including remains of Eskimo dwellings of an exceptionally pure type. Investigations in marine zoology would also be carried out in the waters of the bay. Mr. Rasmussen states that the work of his station at Thule—which has been organised on a permanent basis, and is administered by a private committee—has now secured the support on its scientific side of an advisory council, consisting of some of the most eminent men of science in Denmark. The members of this council are Dr. C. H. Ostenfeld, Director of the Copenhagen Botanical Museum; Captain I. P. Koch, of the Danish Army, who has himself done important exploring work in Greenland; and three of the Professors of Copenhagen University—namely, Dr. H. Jungersen, Professor of Zoology; Mr. O. B. Boggild, Professor of Geology and Mineralogy; and Mr. H. P. Steensby, Professor of Geography and Ethnography. With such support, Mr. Rasmussen hopes that his station at Thule will become a centre for scientific research of an extended and varied character, and that what he has been able to accomplish hitherto will prove to be only the beginning of far greater things.

Commercial Geography.

Australian Transcontinental Railway.—According to a note in the *Journal* of the Royal Society of Arts considerable progress has been made with the proposed railway from Port Augusta, South Australia, to Kalgoorlie, Western Australia. The railway will be 1063 miles long, and will save mails and passengers two to three days as compared with the present sea journey, according to the destination. The route is fairly easy and the bridge work light, but the country traversed offers few prospects except for grazing and the possibility of mineral wealth. In South Australia the survey is complete throughout, and a considerable amount of plate-laying has been done there as well as in Western Australia. Some survey work remains to be done in Western Australia, but it is hoped that the rails may be laid throughout by the end of the present year.

EDUCATIONAL.

Summer School of Geography at Oxford.—Arrangements have been made for the usual short summer course in geography to be held at Oxford this year. The introductory lecture will be delivered on the afternoon of August 3, and thereafter there will be two lectures and at least one period of practical work or an excursion each day. There will be short courses on selected topics of physical, historical, and political geography (especially geographical problems affecting the war and the British Empire), on transport and trade routes, on the teaching of geography, and on the Oxford district. Application should be made to the Vacation Course Secretary, School of Geography, 40 Broad Street, Oxford, as soon as possible.

NEW BOOKS.

EUROPE.

To La France. By E. Alexander Powell, author of *Fighting in Flanders*, etc. London: William Heinemann, 1916. *Price* 3*s.* 6*d. net*

Mr. Powell dedicates his book "To France," and, with the exception of one chapter devoted to the British section of the line, it deals with the author's experiences with the French armies in the field. Armed with a general pass from the French Ministry of War, which proved to be an *open sesame*, his path was everywhere made smooth, he was taken under the wing of the Staff, and was allowed privileges in the way of seeing the actual fighting which have rarely been granted to other special correspondents. His being an American may account for these very special favours; but, be that as it may, his readers have reason to be thankful that Mr. Powell was able to make the most of his privileges, for his book is certainly "a bit of the real thing." He tells with harrowing details—but probably not any more harrowing than the facts warrant—of the awful scenes he witnessed during an advance which had been prepared for by a long period of shell fire. In justification of this and other terrible pictures he says, "I am aware that this makes anything but pleasant reading, my friends, but if men of gentle birth, men with university educations, men who are accustomed to the same refinements and luxuries that you are, can endure these things, why, it seems to me that you ought to be able to endure reading about them." And we imagine that few will be found to deny the justice of this dictum.

The portion of the book headed "On the British Battle Line" is worthy of notice as the frank and, on the whole, friendly comment of an American on our army, its officers, and its men, as well as on the attitude of the British people at home towards the great struggle. We are tempted to quote, but it is difficult to choose, and wholesale quotation is not permissible here. We can only advise our readers to get Mr. Powell's book and read it for themselves.

Poland. By W. Alison Phillips. (Home University Library.) London: Williams and Norgate, 1915. *Price* 1*s. net.*

Although history in rather a tabloid form, this book gives us the leading features of the sad story of Poland. As Professor Phillips points out, the Poles have now the choice of living either under the aegis of the Russians who have

chastised them with whips, or of the Germans who have chastised them with scorpions. In a chapter on "The Poles and the War," he discusses this important international question. He shows that even in the Kingdom of Poland, though public opinion seemed overwhelmingly on the side of Russia, it was not absolutely united. In Galicia the differences of opinion were naturally far more deep-rooted. The Austrian Poles were by no means disposed enthusiastically to exchange the certain advantages of the Austrian connection, under which they had enjoyed self-government and the protection of their culture, for the uncertain prospects held out to them by the promises of Russia. As a matter of fact, many Galician Poles fought willingly against the Russians.

The author suggests that the present policy of Germany towards Poland was perhaps inspired by Bismarck's statement in 1863 that if Russia were driven out of Poland Prussia would march in, adding, "In three years everything fundamental would be Germanised." It is clear that the Germans having regained Warsaw and the line of the Vistula, have no intention of retiring willingly from them. German economists have advised that all the sources of economic power in Poland, including properties large and small, should pass into German hands. Professor Phillips denounces this "German spirit of conquest." He tells the awful story of the Polish church of Czenstochowa being desecrated by the German soldiery, its particularly sacred image of the Virgin being wrenched from its frame and sent to Germany, and a vulgar portrait of the Kaiser in uniform being placed on the altar, and the wretched Poles being driven by brutal German soldiers to kneel before it! "This episode," he adds, "is symbolical of the attitude of the Poles and the Germans towards each other."

ASIA.

Jerusalem. By Pierre Loti. Translated from the French by W. P. Baines. With 8 Illustrations in Colour by John Fulleylove, R.I. London: T. Werner Laurie, Ltd., 1915. *Price 7s. 6d. net.*

No land has had so much written about it as Palestine, and the Holy City of Jerusalem has had many lovers. Some have journeyed to Jerusalem to discover the traces of olden times, and to dig deep for every stone whose form or markings may throw light upon the times of Solomon or of Herod. And recent archæological discoveries have helped to illumine many pages of the past. Others with simple, earnest faith have gone on pilgrimage that they might confirm faith, and make real to themselves the walk of the Christ of history. But of no pilgrimage is it so true as of the journey to Palestine, that the traveller sees only what he takes with him—the power of seeing. Pierre Loti has no patience with the ordinary tourists, "the noisy tourists of the agencies," whom he speaks of as "seeing and profaning" the sacred spots in the course of their itinerary. To visit Jerusalem aright one must know something about its great and tragic past; there must be a certain knowledge of what exploration has done to bridge the centuries and enable us to see not the city but the "buried cities of Jerusalem"; and above all, the traveller must take his Bible with him even though he should forget his Baedeker. The writer of this volume journeyed to Jerusalem prepared in this fashion, and he has given to us a work that from first to last throbs with interest. He has not added to the archæological knowledge of the Holy City, though here and there he shows his keen interest in this direction, nor can he be said to have set down for us mere travel pictures of the scenes through which he passed. And yet few writers have given us the story in so fascinating a form. The book is one which it is impossible

to criticise, for it is a human document of surpassing pathos and tenderness, the pilgrimage of a soul.

The writer's French loses nothing in the careful translation into English, and the eight illustrations are most beautiful pictures that recall most effectively, to all who have visited Jerusalem, the colour and the beauty of the scenes depicted.

The History of Kathiawad from the Earliest Times. By Captain H. Wilberforce-Bell, lately Political Agent, Sorath. With a Preface by the Hon. C. H. H. Hill, C.S.I., C.I.E., I.C.S. With Illustrations and a Map. London: William Heinemann, 1916. *Price* 12*s.* 6*d. net.*

Kathiawad is better known to the great majority of English readers as Kathiawar, the Hunterian transliteration, which might have been allowed to stand in an English book, as also Gaekwar, etc., instead of the "Gaekwad" of Captain Wilberforce-Bell and the Orientalists.

Geographically, Kathiawad or Kathiawar is interesting as the peninsula, literally almost an island, projecting westward just where Southern India or the Deccan may be said to end and Northern India to begin. That it was once wholly insular is probable, although it is not necessary to assume that it was an effluent of the Indus, discharging into the Gulf of Cambay, that formerly severed Kathiawar from the mainland. Here also begins the portion of the western coast too far north to be certain of its rainfall from the south-west monsoon. Kathiawar suffered severely from the famine of 1899-1901.

The general student of India associates Kathiawar with various things chiefly connected with the religions of India. To Hindus it is the scene of the death of Krishna, who fulfilled his destiny at Probhas Patan or Somnath. At Somnath also was the rich and renowned temple of Siva, so dramatically destroyed and looted in the jehad of the Afghan Mahmud of Ghazni. This latest historian is silent regarding the profoundly interesting historical "documents" presented in some parts of Kathiawar in the Hindu temples transformed into Mahomedan mosques. Connected with Buddhism, there is in the extreme west the great granite rock covered with the fourteen edicts of King Asoka, the Buddhist "Constantine." The account of Asoka and the rock inscription is perhaps the least satisfactory page in the History. From Kathiawar again came, although Captain Wilberforce-Bell does not mention the fact, the founder of the Arya Samāj, the most successful of the modern sects. Last, but not least known, Prince Ranjitsinji, the sportsman, is the enlightened ruler of Jamnagar, one of the "first-class" Kathiawar states. We are reminded in the History that he is also one of the rulers who at the outbreak of the war proceeded to France to do their bit for the Empire.

The *History of Kathiawad*, minutely detailed for modern times, is a piece of work such as one expects from the best type of Indian official, one who has mastered a vernacular, and is keenly interested in the province in which he is the interpreter of the Empire to India. The historian of Kathiawar, however, like the historian of India itself, is severely handicapped. Kathiawar is a geographical but not a political unity in any real sense. One doubts whether in Kathiawar there is any Kathiawari consciousness. Like India itself, the unity of Kathiawar is British-made. It is a unity as constituting the "Kathiawar Agency" under the Governor of Bombay: internally it consists of one hundred and eighty-eight mutually diverse states. Its modern progress has been rapid, and, for India, it is well supplied with railways, where in 1865 there was not a single mile of modern road.

AFRICA.

A Naturalist in Madagascar. A Record of Observations, Experiences, and Impressions made during a period of over Fifty Years' Intimate Association with the Natives, and Study of the Animal and Vegetable Life of the Island. By James Sibree, F.R.G.S. With 52 Illustrations and 3 Maps. Demy 8vo. Pp. 320. London: Seeley, Service and Co., 1915. *Price* 16*s. net.*

In 1863 Mr. Sibree landed from a "bullocker," or cattle-boat, on Madagascar, which was to be the sphere of his missionary work for over half a century. During his residence there he travelled extensively; indeed, he was the first European to explore and map certain regions in the southern half of the island. Possessed of an observant eye, an appreciative ear, and an active brain, he found in the human, animal, and vegetable life of his adopted country much to interest him, and in his latest volume we have a popular account of what he has seen and heard.

Madagascar is a "kind of museum of ancient and elsewhere unknown forms of life," and Mr. Sibree provides a great store of information about it. Throughout the volume we get side-lights on the physical features, geology, climate, mineral wealth, and productions of the island, but the bulk of the book is devoted to describing Malagasy tribes, their various activities, customs, superstitions, houses, and to instructing us about the strange and, in many cases, rare forms of animal and vegetable life to be found in the country.

One of the interesting points in the daily life of the Hova tribe is their division of time. The day between 9 A.M. and 6.45 P.M. is divided into periods which are named according to the various positions that the sun's rays have in relation to various parts of the house, the house thus acting as a sort of sundial. A strange custom of a tribe living in Anorò̀ro is as follows: "In the rainy season, when the water rises, it enters into the houses of these people, and they then put together several layers of zozò̀ro (sedge) to form a kind of raft, so that, as the water rises, this raft rises with it. Upon these zozò̀ro they make their hearths and their beds; and there they live, rising and falling with the water, until the rainy season is over and they can live on the ground again."

Tempting as it is to quote from Mr. Sibree's accounts of the fossa, aye-aye, lemur, chameleon, and other forms of life, it is impossible to do more than mention that the abundant, and, in many instances, unusual flora and fauna of Madagascar provide the scientific observer with many interesting problems. Those who are convinced that animals do not mimic plants or animals to protect themselves from enemies should read the book, and they will find that Mr. Sibree's evidence to the contrary can at least shake their confidence in their beliefs. Grasshoppers are found which resemble *green* grass, and others which imitate *dry* grass. One butterfly has "several strongly marked and dark-tinted processes from the hinder part of the wings which resemble the head, eyes, and antennae of a butterfly, so that when at rest it is very difficult to say which is the head and which is the tail of the insect."

The book, which is provided with numerous beautiful illustrations, is written in a discursive yet pleasing manner, and will provide both interest and profit to any who peruse it. Kindly touches of humour light it up. The easy and familiar literary style is perhaps responsible for occasional lapses from the purest English, as, *e.g.* (p. 219): "Walking round the southern end of the crater edge, the lake has a somewhat close resemblance," etc. More careful proof-reading would have cleared up the meaning of such a sentence as: "This (*i.e.* dried cow-dung) is used as fuel for burning; and splitting off large slabs of gneiss rock." While noting

those blemishes, it is only fair to mention that we readily forget them when, as he frequently does, Mr. Sibree balances them by beautiful descriptions of scenery, sunsets, and forest life.

BOOKS RECEIVED.

The World We Live In. An Illustrated Description of all the Lands and Seas of the Globe, their Peoples, Animals, Plants and Products. Edited by GRAEME WILLIAMS, F.R.G.S., F.G.S., F.Z.S. With an Introduction by LIONEL W. LYDE, M.A., F.R.G.S. Crown 4to. To be completed in 4 volumes. Vols. i. and ii. Pp. 464. *Price* 34*s. for the* 4 *volumes.* London: The Waverley Book Company, 1916.

Syria as a Roman Province. By E. S. BOUCHIER, M.A. Crown 8vo. Pp. viii + 304. *Price* 6*s. net.* Oxford: B. H. Blackwell, 1916.

Bibliographie Japonaise ou Catalogue des Ouvrages Relatifs au Japon. Par M. LÉON PAGES. Paris, 1859. *Presented by Dr. Wm. K. Dickson, Edinburgh.*

"Verb Sap." on going to West Africa, to Northern and Southern Nigeria and to The Coasts. By Capt. ALAN FIELD, F.R.G.S. Crown 8vo. Pp. 251. *Price* 2*s.* 6*d. net.* London: The "V.S." Syndicate, Ltd., 1916.

"The Times" Book of Russia: Finance, Commerce, Industries. With an Introduction by Sir DONALD MACKENZIE WALLACE, K.C.I.E., K.C.V.O. 7 Maps. Crown 8vo. Pp. xx + 268. *Price* 2*s. net.* London: "The Times," 1916.

Black and White in South-East Africa: A Study of Sociology. By MAURICE S. EVANS, C.M.G. With a Preface by Lieut.-Colonel Sir MATTHEW NATHAN, G.C.M.G. With a Map. Second Edition. Demy 8vo. Pp. xxii + 341. *Price* 7*s.* 6*d.* London: Longmans, Green and Co., 1916.

From Moscow to the Persian Gulf: Being the Journal of a Disenchanted Traveller in Turkestan and Persia. By BENJAMIN BURGES MOORE. With 160 Illustrations and a Map. Demy 8vo. Pp. xx + 443. *Price* 10*s.* 6*d. net.* London: G. P. Putnam's Sons, 1915.

The Self-Discovery of Russia. By J. Y. SIMPSON. Demy 8vo. Pp. viii + 227. *Price* 6*s. net.* London: Constable and Co., Ltd., 1916.

Twenty Years in Baghdad and Syria: Showing Germany's Bid for the Mastery of the East. By Canon J. T. PARFIT. Crown 8vo. Pp. 122. *Price* 1*s.* London: Simpkin, Marshall, Hamilton, Kent and Co., 1916.

A Regional Geography of the Six Continents. Book III. *North America.* By ELLIS W. HEATON, B.Sc., F.G.S. Crown 8vo. Pp. 94. *Price* 1*s.* London: Ralph, Holland and Co., 1916.

Records of the Survey of India. Vol. VI. *Completion of the link connecting the Triangulations of India and Russia*, 1913. Dehra Dun, 1914.

Report on the Administration of Assam for 1914-15. Shillong, 1916.

Records of the Survey of India. Vol. VIII. Annual Reports.

On the Identity of the Human Races which formed respectively the British and French Nationalities. By F. ROMANET DU CAILLAUD. Pp. 8. London, 1915.

Distribution of Nationalities in Hungary. By B. C. WALLIS. Pp. 12. With a Map. London, 1916.

A Syallbus in War-Geography and History. By ALBERT A. COCK, M.A. Pp. 32. *Price* 6*d. net.* London: G. Philip and Son, Ltd., 1916.

Publishers forwarding books for review will greatly oblige by marking the price *in clear figures, especially in the case of foreign books.*

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

IS THE INCREASING CONTROL OF MAN OVER NATURE MAKING HIM INDEPENDENT OF GEOGRAPHICAL CONDITIONS?[1]

By George G. Chisholm, M.A., B.Sc.

This question may, perhaps, seem a strange one, yet the statement that man's increasing control of nature is having the effect indicated is often repeated and even gets some recognition from avowed geographers. It has been again recalled to my mind by reading the excellent work on the geography of communications by Professor Kurt Hassert of the Commercial High School of Cologne,[2] where the subject is briefly but carefully handled. On page 63 of that work the author refers to the technical skill of railway engineers as gradually withdrawing man more and more from the constraint of nature, or, as he puts it more explicitly, so far as possible making the natural conditions subservient to his purposes: and he there refers us to an earlier passage of his work where he expressly points out that the progress of man can never entirely withdraw him from the constraint of nature, so that in spite of all the advances made by man the influence of the geographical conditions affecting human intercourse is always more or less apparent. And it is in a note to this passage that is found, perhaps, the most remarkable explicit statement upon the part of a geographer in support of the view hinted at in the title of this article. He quotes from Baron von

[1] This article has already appeared in the *Journal of Geography*, vol. xii.—Ed. *S.G.M.*

[2] *Allgemeine Verkehrsgeographie*, by Dr. Kurt Hassert (Goeschen, Berlin and Leipzig, 1913). Since this article was written (Dec. 1913), the illuminating work entitled *Industrial and Commercial Geography*, by Professor J. Russell Smith (Henry Holt and Co., 1913), has come into my hands, and I would refer more particularly to pp. 679-682 as supporting the general contentions of this article.

Richthofen a passage in which the geography of communications is defined as concerning itself with the aims and methods of intercourse with their relations to the natural conditions of countries, but von Richthofen adds, "Whoever pursues the subject of the geography of communications in the sphere of modern civilisation finds himself face to face only with exceptional conditions. Natural obstacles to communication . . . have almost lost their importance: we are apt to devote ourselves to the consideration of the geography of communications of past times, or lands that are only in a minor degree opened up, but the first railway laid through these countries destroys our results, and the geography of communications in the realms of western civilisation has in its main features only distant relations with physical geography and becomes more and more a branch of economics."

If we find such a statement made by a geographer it is less surprising to find an even more confident statement made by a railway man. Mr. Hugo R. Meyer in criticising some of the decisions of the Interstate Commerce Commission on the ground that that Commission condemns as monstrous the railway rate practice that would be ideal, declares that "the ideal system would relieve every city from every disadvantage in the markets of other cities and would deprive all cities or places of production of all advantages resulting from their location"[1]—a very remarkable view for an American book, seeing that nowhere has the influence of railways been more potent in concentrating population on a few points than in America.

Such contentions as these could hardly fail to arrest my attention when I came across them, seeing that in all the editions of my *Handbook of Commercial Geography* I have maintained on the contrary that in consequence of the advances in civilisation "commerce and industry tend to be governed more and more by purely geographical conditions"; and I see no reason to modify this statement, except in so far as to delete the word "purely." The question here under discussion was raised and answered by Ratzel in his *Anthropogeographie*, first part, pages 63-65, and on pages 69-70 of Miss Semple's *Influences of Geographic Environment* we have her restatement and independent reinforcement of Ratzel's views in the following passage:

"Since progress in civilisation involves an increasing exploitation of natural advantages and the development of closer relations between a land and its people, it is an erroneous idea that man tends to emancipate himself more and more from the control of the natural conditions forming at once the foundation and environment of his activities. On the contrary, he multiplies his dependencies upon nature; but while increasing their sum total, he diminishes the force of each. There lies the gist of the matter. As his bonds become more numerous, they become also more elastic. Civilisation has lengthened his leash and padded his collar, so that it does not gall; but the leash is never slipped. The Delaware Indians depended upon the forests alone for fuel. A citizen of Pennsylvania, occupying the former Delaware tract, has the choice of

[1] *Government Regulation of Railway Rates*, 1905, page 361.

wood, hard or soft coal, coke, petroleum, natural gas, or manufactured gas. Does this mean emancipation? By no means. For while fuel was a necessity to the Indians only for warmth and cooking, and incidentally for the pleasurable excitement of burning an enemy at the stake, it enters into the manufacture of almost every article that the Pennsylvanian uses in his daily life. His dependence upon nature has become more far-reaching, though less conspicuous and especially less arbitrary."

What suggests the idea of a man's growing independence of geographical conditions is fairly obvious. If an isthmus stands in his way between two oceans, he cuts it; if a mountain range is the obstacle, he bores it, but surely geographical conditions are prominent in determining where it is most worth while to cut isthmuses and where and how tunnels may be pierced with most advantage.

In all the circumstances Richthofen's statement with regard to railways is really extraordinary, especially as coming from a geographer belonging to a country in which the Rhine valley still exercises in the railway era the same marked influence on the direction of the means of communication in western Germany as it has done throughout human history. Further, however numerous railways may be they are nowhere so numerous as roads, at least in countries of old civilisation, and this would suggest that the routes for railways would be selected with even more care than the routes for roads, and no very close examination of any good map showing roads and railways is needed to show that this is the case, and that even in comparatively level countries due regard is paid in the laying of railways to the influence of the physical features. In mountainous and hilly countries this becomes at once obvious. It is true that in such countries the routes of the railways are sometimes found to vary from those of the old high roads connecting the same regions. The route of the Mont Cenis railway in piercing the Alps is not exactly that of the old Mont Cenis road. The railway from Florence to Bologna does not go as the old road did due north across the La Futa pass, but deviates north-westwards by Pistoja to the valley of the Ombrone and then north-east up that valley and down that of the Reno. But in doing so we find that geographical influences are the determining cause of the change. The old roads favoured a gradual ascent over the broader part of a mountain region in order to get over the top, but railways seek routes that may take them farther into the heart of the mountains in order that, where a tunnel has to be pierced, the length of the tunnel may be reduced. On the borders of England and Scotland there is a peculiarly interesting illustration of such a deviation. The old roads connecting England and Scotland for the most part either went to the east of the Cheviots or to the west, but there was one much frequented road that went right across the Cheviots by way of Carter Bar, ascending on the English side the valley of the Rede and then descending on the Scottish side the valley of the Jed by Jedburgh to Roxburgh. Then again an old road goes from Carlisle through Langholm to Hawick, crossing a spur of the Cheviots at a height of about 800 feet. But in modern times there is no railway by either of these

routes, and the railway that connects Carlisle with Hawick follows a route which is actually more difficult than that by way of Langholm. It ascends the valley of the Liddel and rises to the height of about 1000 feet before the Cheviots are pierced in a tunnel of about one mile in length. But on examination the reason becomes apparent upon geographical grounds, and we find that this reason suggested by geography is confirmed by the history of the railway. The more difficult route is followed for the Carlisle-Hawick line because the same tunnel now serves to establish both that railway connection and the connection of the Tweed valley with the middle Tyne which was formerly made by way of Carter Bar. In this latter case the railway ascends to the head of the valley of the north Tyne and joins the Liddisdale railway a short distance before the entrance to the tunnel.

A little consideration, however, will enable us to see what lay behind von Richthofen's statement on the geography of railways. It is true that as soon as railways were introduced it became easier to establish important lines of communication wherever they were wanted. Important towns would thus be connected by rail whatever the character of the intervening country. These towns must have owed their importance originally to quite different conditions, in many cases to the traffic created by waterways. In these cases accordingly it must be recognised that the routes of the railways were determined in a large measure by physical conditions that no longer have the same importance, and that the influence of physical conditions on the general direction of the routes belongs to the past.

The influence of geographical conditions on modern transport is most manifest where competition is keenest, where those who know most about the means of controlling nature are straining every nerve to turn every advantage to account. Professor Thorold Rogers mentions a case in which he, as a member of the House of Commons, sat on a committee appointed to consider a bill promoted for the laying of a new railway in Yorkshire, and he says, "I asked one of the landowners who wished to get the bill, why they set so much store by it, seeing that no part of the district was more than 2½ miles from an existing railway, and he told me, I do not doubt with perfect accuracy, that such was the competition that the difference of profit and loss on working lay in those 2½ miles of haulage."[1]

This is a somewhat minute instance. A larger and better illustration of the influence of geographical conditions upon transport and on the importance of towns that compete for the transport is to be found in the rivalry between Philadelphia, New York, and Boston for the traffic of the west. About the beginning of last century it was Philadelphia, the nearest of these towns to the west, that had the largest share of that traffic, and it is well known that New York began to gain upon Philadelphia only after the opening of the Erie Canal by the easy but roundabout route connecting Lake Erie with the River Hudson. Nowadays the principal railways to the west follow the same route, and an examina-

[1] *Economic Interpretation of History* (London, 1888), pp. 230-31.

tion of the traffic conditions shows that this route, though the longer, is the more advantageous. Boston again is at about the same direct distance as New York from Albany, from which point the chief railways from these two seaports have a common route to the west. But the route from Boston to Albany is through hilly and even mountainous country involving not only much steeper gradients than those by the Hudson valley but adding considerably to the length of the route, making the railway distance by Springfield and Pittsfield to Albany 201 miles against 142 miles from New York, and the whole distance from Boston to Chicago 1037½ miles against 979 from New York. The consequence is that in competition for traffic with the west Boston is altogether out of the running. On the other hand, there is keen competition between routes going by way of the Hudson-Mohawk valley and the shorter but more difficult routes that pass across the northern Appalachians. By the shortest of these routes, which actually passes through Philadelphia and then goes by Pittsburg and Fort Wayne, the distance is only 908 miles, but this is a route that involves heavy gradients, in one place a gradient of 1 in 60 for 11 miles in length. Where two such powerful railway systems are concerned as the New York Central, to which the Hudson route belongs, and the Pennsylvania railroad, which is the owner of the Fort Wayne route, we may be sure that everything is done that can be done to take advantage of the geographical conditions afforded by each. I find on examination of a recent time-table that between New York and Chicago there were nine trains per day west-bound running by the Hudson river route in less than 26 hours as against five by the Fort Wayne route: seven in less than 25 hours as against five by the Fort Wayne route: five in 24 hours or less by the Hudson river route as against three by the Fort Wayne route, while each route managed to send one train per day in 17 hours 55 minutes. East-bound there were eight trains running in less than 26 hours by the Hudson river route against only four by the Fort Wayne route: six in less than 25 hours by the Hudson river route: five in 23 hours or less against only three by the Fort Wayne route: and again one on each route in 17 hours 55 minutes. Here manifestly geographical advantages as determined by the shortness of the route are hardly able to neutralise the disadvantages due to the heaviness of the gradient. The one train in 17 hours 55 minutes, which is at an average rate of a little more than 52 miles per hour over the entire journey, is obviously a *tour de force* demanded by the corresponding train of New York Central, which is run at the rate of about 57 miles per hour over all. Obviously of course Philadelphia is placed in quicker communication with Chicago than New York, but here we have another advantage telling in favour of New York even under modern conditions—namely, the superiority of New York harbour. As for other routes to the west from New York there are several that are shorter than the Hudson river route, such as that which is called the Panhandle route by Philadelphia, Pittsburg, Columbus and Logansport, which is only 945 miles in length, but on which no train runs in less than 27 hours 50 minutes: the Delaware, Lackawanna and Western route, 934 miles in length, but on which no train runs in less than 28 hours. In

the case of Boston there is for the most part a difference of time against that city in competition with New York of at least two hours, the shortest difference being 70 minutes, equal to a rate of about 50½ miles an hour, or the 59 miles of difference between Boston and Albany as compared with New York and Albany. It is true that there is another route to the west, what is called the Boston and Maine route passing through the Hoosac tunnel, the opening of which was so eagerly and almost despairingly looked for by the Bostonians that Oliver Wendell Holmes in his *Autocrat of the Breakfast Table* referred to this event as one of his humorous equivalents of the Greek Kalends :

> When the first locomotive wheel
> Rolls through the Hoosac tunnel's bore.

But this route, though slightly shorter, 1033 miles against 1037½, is also under the disadvantage of steeper gradients, and the train that runs in the shortest time on this route takes 25 hours as against 20 hours 20 minutes by the Boston and Albany route.

In England there was formerly an interesting illustration of the same competition based upon differences in geographical conditions in the lines running from London to Plymouth belonging to the Great Western Railway and the London and South-Western Railway respectively. The Great Western route was the longer, 247 miles as against 234 by the South-Western, but the Great Western route followed the valleys, whereas the South-Western route to a large extent cut across the valleys involving heavier gradients, and hence it was only the advantage in distance that enabled it to maintain competitive trains with those of the Great Western system. Ultimately, however, the Great Western found a comparatively easy way of reducing its length to 226½ miles, and since then it may be said that the South-Western line has abandoned the competition.

These illustrations serve to dispose of Mr. Meyer's idea as to the possibility of annihilating geographical advantages, and support the contention to which I have committed myself in the passage that I have cited above, a passage which, it may be mentioned, merely states more shortly what is involved in the following statement of Ratzel's : "It may be set down as a rule that a great part of the advance of civilisation is in the direction of a more thorough utilisation of natural local endowments, and that in this sense this progress establishes more intimate relations between land and people." But something more should be added to show the nature of the misconception underlying Mr. Meyer's idea. Unquestionably a rate may in certain cases be profitable to a railway company which would not be profitable if no better rate were to be obtained from its entire traffic. But there is a limit to this. In any case only one out of many geographical factors is affected when the rate for the haulage of finished goods is eliminated, and that is what Mr. Meyer chiefly seems to have in view. These are factors which affect different industries in different ways and degrees. Some industries might be carried on almost anywhere with equal advantage within a wide area. Where the industries are such as to derive great advantage

from large-scale production the distance from the market may be completely compensated by reduction in freight so as to make local competition on a small scale impracticable. For such industries any one of a thousand localities, say, in the north-east of the United States where there is abundant labour and abundant means of communication, might be equally advantageous, but no one would think of trying to set up one of them, say, in Phoenix or Tucson, Arizona. This is specially true of industries for the products of which there is a widespread demand, but a demand after all so limited in quantity that a single factory, or one or two factories, are able to turn out all that is required, as, for example, in the case of adding machines. But with regard to the localisation of industry one has to think not merely of the cost of conveyance of the finished article. The cost of the raw materials has to be considered, and surely Mr. Meyer would not contend that it can be made by railway rates a matter of complete indifference where bulky raw materials are to be found, and especially bulky raw materials of a certain kind. A very fruitful idea was put forth a few years ago in a German book relating to the localisation of industries, where it is pointed out that raw materials are likely to have an effect in drawing the industries to places in or near which they are found in proportion to the amount of the waste of such materials in manufacture.[1] He declares that raw materials which enter wholly into the finished article without any waste can have no effect in localising the production, but where the waste is great the localising effect is also likely to be great. It is for this reason, for example, that coal has such a strong effect in some countries in developing industries in the neighbourhood of the mines, because no part of the coal enters into the finished product.

The fact that the United States, the greatest coal-producing country in the world, is far from being a conspicuous illustration under this head is interesting, and interesting, moreover, in relation to our present subject. Most of the great manufacturing towns of the United States are not on coal-fields, but are great commercial centres like Chicago, Buffalo, Cincinnati, and some of the seaports, situated at spots where the geographical features have determined the convergence of great lines of communication. If Pittsburg is one illustration of the influence of coal, it has to be remembered that that is not the sole influence at work there in the development of industry. The growth of Pittsburg has been greatly promoted by the convergence of waterways, supplemented by the convergence of railways which the convergence of important waterways helped greatly in bringing about.

In connection with this we may note another consideration pertinent as a reply to Mr. Meyer's claim that it is conceivably possible for railways to render nugatory all geographical advantages. A recent economic writer avers[2] that "it is roughly true to say that nowadays it costs more to sell most articles than to make them." One of the costs of selling is the employment of commercial travellers, and it is obvious

[1] Weber, *Ueber den Standort der Industrien*, 1909, pages 61-62.

[2] G. B. Dibblee, *The Laws of Supply and Demand*, London, 1912, p. 47.

that they are most advantageously employed for the most part where multitudes of people can be reached by short journeys. It is impracticable for railways to equalise different producing centres under this head by reducing the fare for the commercial traveller in proportion to his disadvantage in competition with the travellers of rival centres. That is one reason, but only one reason, why there are few manufacturing industries that I could recommend any one to try to establish in Phoenix or Tucson. Then again, as I have pointed out elsewhere, one of the costs of selling certain products, such as complicated machinery, is the necessity for maintaining and sending out experts to supervise the working of the machinery if anything goes wrong, and it would be difficult for railways to deprive a plant producing the machinery in question of the advantage it has in being easily accessible from the place where the machinery is to be set up.

But further it has to be pointed out, with regard to Mr. Meyer's contention as to the possibility of destroying all geographical advantages by the manipulation of railway rates, that this assumes that railway rates are competitive. The specially advantageous rates that would enable a distant place of production to compete with a neighbouring place of production are generally offered in order to acquire additional traffic by taking it away from another company. If traffic can thereby be gained, however small the addition may be to the profits of the successful company, it is always an addition of something worth striving for. But this state of matters tends to be brought to an end in modern conditions in more ways than one. First, one railway may succeed in acquiring complete control of the traffic by driving out the competition of the rival line altogether, and in such a case it is no longer so important for the company that is left in command of the traffic to give specially favourable rates, and once more accordingly geographical conditions would reappear as affecting the relative advantages of different places. And even when one railway is not successful in driving out the other, the two railways may even find it to their advantage to come to some pooling arrangement, and in this we may be sure that geographical conditions will again appear as influencing the rates. It is such considerations as these, no doubt, that make the Interstate Commerce Commission so distrustful of railways, so unwilling to leave them to fix rates uncontrolled even on principles alleged to be ideal.

But on the question of gradients there is something more to be said. The comparisons above made were between express trains on different routes, that is to say, trains of only moderate weight. Obviously the loss on the steep gradients must be much greater with heavy freight trains, giving all the greater advantage in their case to the routes with easy gradients. But here modern invention brings up another consideration, the employment of a system of electric traction which allows of power being stored up when trains are going down grade, thus effecting an important economy which cannot be secured with steam-drawn trains. We are informed, for example, that on the Giovi line, the line connecting Genoa with the plains of Lombardy, the recovery of power in this way "saves 17 per cent. of the coal bill, and this amount is sufficient to

provide for interest and sinking fund on the electrical plant at the generating station."[1] Manifestly this fact will assist the heavy gradients in their competition with the easier ones. Nevertheless it does not annihilate the advantage of easy grades, and even if it did we should still have to recognise geographical influences, inasmuch as heavy grades will become all the more important as factors in urging on the introduction of electric traction.

In connection with marine traffic the growing influence of geographical conditions is also observable. In the old days when leisurely voyages were made to the East once in two years, the study of winds and currents was by no means so important as it became, for example, in the days of the races between British and American clippers from China to London in the early fifties of last century. The introduction of steam, while it has made navigators more independent of winds and currents, has made them all the keener in the study (not necessarily the adoption) of great circle routes so as to shorten distances between ports to the utmost.

The truth is that what is tending to weaken the influence of geographical conditions at the present time is less the increasing control of man over nature than the efforts arising from what is believed to be national or state interest to thwart others in taking full advantage of favourable geographical conditions. With this in view various methods are adopted apart from protective tariffs. Canada has to some extent succeeded in deviating traffic from eastern ports of the United States by the abolition of tolls on the canals of the St. Lawrence, and it is the rivalry between the opposite sides of the United States frontier that is leading to the enormous expenditure now going on in the enlargement of the Erie Canal by the State of New York, and the contemplated expenditure on the Ottawa and Georgian Bay Canal by the Dominion of Canada. It is to a sense of national interest also that we owe the preferential tariff accorded by Canada to the goods of the United Kingdom as against those from the United States and other foreign countries. But in connection with this I may conclude by pointing out that the advantage of the United States in point of geographical situation has so far counterbalanced the effect of this preference that the percentage of the imports into Canada from the United States remains as great as ever. For a fuller consideration of this case I may refer to the paper by myself, already incidentally alluded to, on "The Geographical Relation of the Market to the Seats of Industry," in the *Scottish Geographical Magazine* for 1910, page 180.

[1] Presidential address of Prof. Gisbert Kapp, Engineering Section, British Association, Birmingham Meeting (1913), *Nature*, Oct. 9, 1913, p. 187.

WU-HAN: THE HEART OF CHINA.

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(With Sketch-Maps and Illustrations.)

UNDER the composite name "Wu-Han" the Chinese group together the three cities of Hankow, Hanyang, and Wuchang, which already constitute an urban unit vaster than Liverpool-Birkenhead or Manchester-Salford, and whose future growth is perhaps destined to exceed that of any similar agglomeration of cities, whether in the Old World or the New: for its site combines geographical advantages to an extent which would be significant in any country, but which is especially so in the case of China. A city possessing exceptional nodality in China must inevitably become one of the greatest economic centres of the world.

To appreciate the significance of the site of "Wu-Han" it is necessary to consider its position in relation to the different economic regions of China. The usual division of that vast country into the three great river basins, although useful for many purposes, hardly conveys an adequate impression of the way in which the most important regions are related to one another. China Proper,[1] east of the great Tibetan Plateau and its flanking mountain buttresses, of which the Szechuan Alps form the easternmost chains, may be conveniently divided as follows:—

A. The North-Western Plateaux (Kansu, Shensi, Shansi), at the southern limit of which is the broad trench of the famous Wei-ho valley, the historic nursery of Chinese civilisation and the starting-point of the very gradual colonising movement by which that civilisation was gradually extended over the immense area of modern China. Singanfu, in the Wei-ho valley, is still the gateway of the north-west, and the focus of the routes from the heart of Asia. If in the future the Chinese railway system is linked up with the Russian Central Asian system of Turkestan, the connecting route must pass to the north of the Nan-Shan mountains which form the north-eastern buttress of the Tibetan Plateau. Singanfu is likely to be the starting-point of a trans-continental railway hardly less important than the Trans-Siberian, running via Lanchow through the Zungarian Gate (between the Thian-Shan and the Altai mountains) into the lowlands of Turkestan.

B. To the east of these plateaux lies the alluvial *Plain of North China* (Chihli, Western Shantung, Honan, Kiangsu and part of Anhui), the approaches to which both from the north-west (Mongolia) and from the north-east (Manchuria), by the narrow gateway between the outermost scarps of the Mongolian Plateau and the Gulf of Pe-Chihli, are domi-

[1] Officially Manchuria is no longer a dependency. The three Manchurian provinces of Shengking, Kirin, and Helungkiang, combined into a single viceroyalty, were incorporated in 1907. But for practical purposes Chihli may still be regarded as the northernmost province of China Proper, and China's hold over Manchuria is notoriously weak and uncertain.

Orographical Sketch-Map of China.

nated by Peking and its port, Tientsin. Peking, while central in relation to the Chinese Empire, is marginal in relation to China Proper. If China loses her great dependencies, the political predominance of Peking may disappear, but as the focus of the northern routes converging towards the heart of China it must retain great economic importance, and from this point of view may be classed with Singanfu. The Peking-Kalgan Railway, running north-westwards up the steep scarp of the Mongolian Plateau, will probably be continued across the Desert of Gobi viâ Urga (the focus of Central Mongolia) to Lake Baikal, and will form by far the shortest link between the Chinese railway system and the Trans-Siberian.

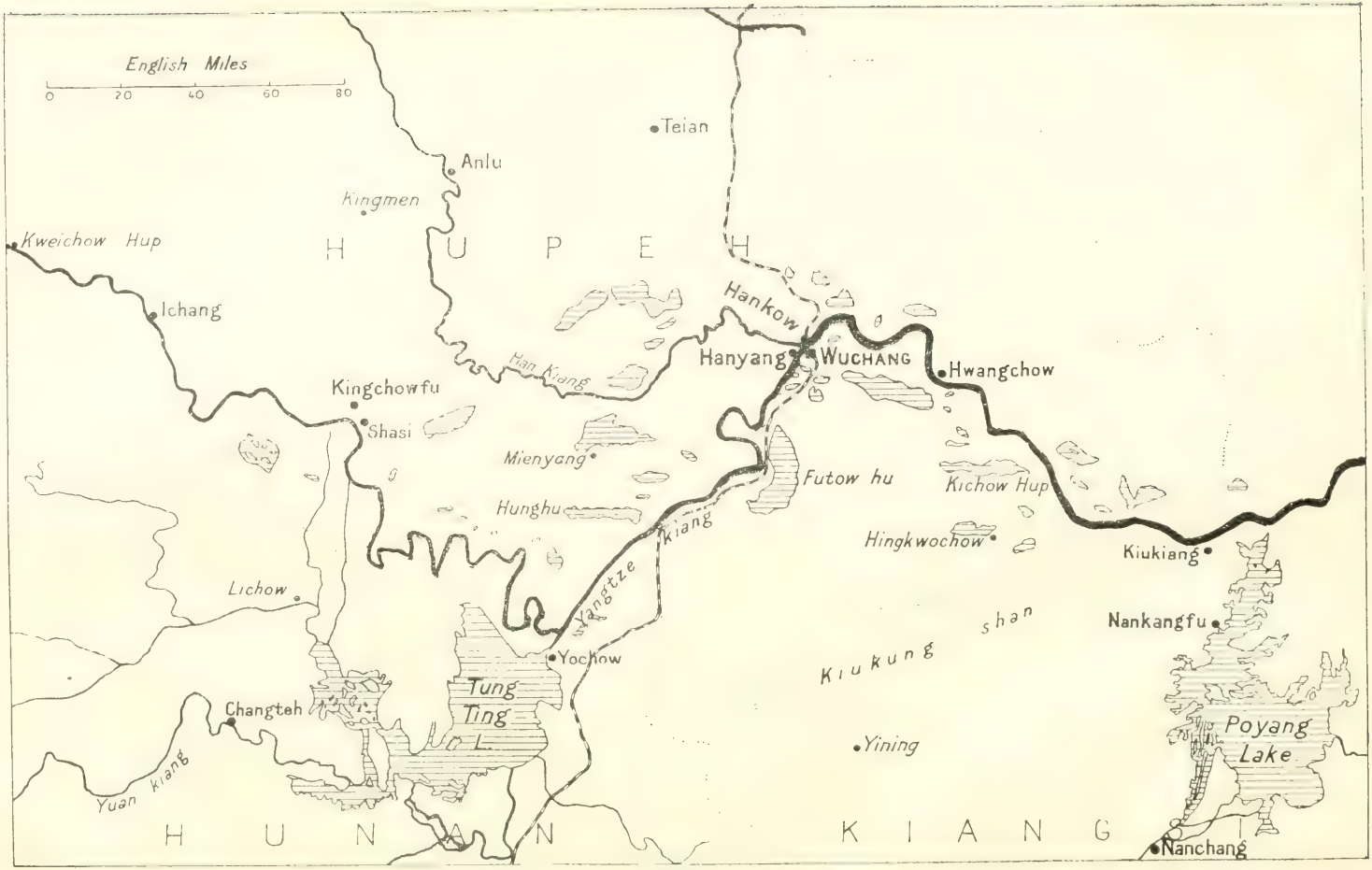
C. To the south of these two main divisions of Northern China (the North-Western Plateaux and the Great Plain) come the *Highlands of Central China*. Their general direction is from west to east, continuing the trend of the ranges which cross the Tibetan Plateau. They are broad, rugged, and forested, with few passes, and these by no means low. They constitute, for all but the eastern third of China, the real boundary between north and south, and are both an economic and a social divide. They fall into two main groups: the northern or Tsinling-Shan, immediately south of the Wei-ho valley, and the southern or Tapa-Shan, separated by the important valley of the Upper Han, which focuses the routes from the north-west to the middle and lower Yang-tze. The regional division of the basin of this great central river is clear.

D. In the extreme west is the *Red Basin of Szechuan*, one of the most productive and densely peopled, but also at present one of the most isolated regions of the world. Cheng-tu, in the heart of the Basin, and Chungking, the port of entry on the Yang-tze, focus the activities of Szechuan, and bear the same relation to the pivot of "Wu-Han" as Singanfu in the north-west and Peking in the north.

E. Separating the Red Basin from the Basin of Hupeh is the complex *Region of the Yang-tze Gorges*, the key to the topographical significance of which is the convergence of the west-to-east mountain chains of Central China with the scarps of the South China Plateau trending from south-west to north-east.

F. At Ichang the great river opens out into the *Central Basin*, of which "Wu-Han" is the focus. The Central Basin really consists of two closely connected lowlands—the Plains of Hupeh on the west and the depression in which lies the Poyang Lake on the east—the two being separated by low but well-marked ridges through which the Yang-tze has excavated a broad channel between Hankow and Wuchang. An analogous case is the separation of the two divisions of the Hungarian Plain by the ridge of the Bakony Forest, and in relation to the local topography the position of Hankow-Wuchang somewhat resembles that of Buda-Pest. To the east the Central Basin opens by a broad neck between the lower eastern spurs of the Central Ranges and the South China Plateau into the deltaic region of the Lower Yang-tze, which topographically is a part of the Northern Plain.

G. There remains the *South China Plateau*, rising by a series of step-like



Sketch-Map to show position of the Wu-Han complex.

terraces from the curving coast to the high Yunnan tableland in the south-west. Here we can distinguish two chief foci: (*a*) the valley of the Lower Sikiang, of which Canton is the natural centre, and (*b*) in the extreme south-west, Yunnanfu. Down to the present time the economic importance of Yunnanfu has been comparatively small, but there can be little doubt that in the future it is destined to be the focus of routes fully as important as those converging upon Singanfu and Peking. Already it is connected with French Indo-China by a railway running from the Tongking border, and we have to think of a time when it will be linked up with the Burmese railways in the neighbourhood of Bhamo,

FIG. 1.—The Yang-tze at Nanking.

and when these in turn will be connected with the Indian railways and pushed southwards through the Isthmus of Kra to join the trunk railway of the Malay Peninsula. In the days, perhaps not very far distant, when it will be possible to travel by train from Calais to Singapore, there will probably be few more important junctions than that at which the Chinese railway system is linked to the main route to the Orient.

From this general survey, the centrality of the position of the "Wu-Han" cities is apparent. If we join the great emporia along the periphery of China Proper—Peking, Singanfu, Chengtu, Yunnanfu, Canton, Shanghai—we get a roughly circular figure of which "Wu-Han" is nearly the centre. Nor is this all. These cities combine centrality in the geometrical sense with nodality in the geographical sense, and this is a combination to which it would be hard to find a parallel in any

other country. The elements in the geographical nodality of "Wu-Han" are as follows:—

(*a*) The main artery of China is and must remain the great waterway of the Yang-tze, and its valley from Ichang to Shanghai is economically the heart of China, and one of the richest regions of the world. All the peripheral regions of China must necessarily be linked up with it.

(*b*) The topographical setting of the central Hupeh-Poyang Basin is such that it acts as a magnet to the majority of routes directed towards the Yang-tze Valley from the peripheral centres. The familiar simile

Fig. 2. Forest of masts on the Han.

of the spokes of a wheel aptly describes the convergence of valley-ways upon it. To the east is the main waterway of the Lower Yang-tze, to the west the trough of the Yang-tze Gorges, difficult indeed, but the only possible route by which the Red Basin can be brought into relation with the heart of China and with the ocean. From the north-west comes the Han, navigable for more than three hundred miles above Hankow, and the obvious route from Singanfu and the north-west. South-west of Wuchang is the Tungting Lake, the largest of the many remaining sheets of water which witness to the time when the Hupeh Basin, like that of Hungary, was an inland sea. Into the Tungting Lake drain two rivers which have excavated deep trenches in the South China Plateau, the Siang from the south and the Yuen from the south-

west. Both as a waterway and as a valley-route, the Siang is almost as important as the Han. On its banks stand Changsha and Hengchow, the two chief cities of Hunan, and the river is navigable up to the latter. But it is as the more important of the two main routes connecting the Yang-tze and Sikiang Basins that the valley derives its chief value. The Canton-Wuchang railway which, when completed and linked up with the existing Hankow-Peking railway, will be the trunk line *par excellence* of China, will run for about a third of its course through this valley and that of its tributary, the Lin. The most difficult section is that from Hengchow to Shuchow (209 miles), in the course of which it will have to cross the main water-parting of South China (the Meling Range) by the Chehling pass; thence southwards to Canton, the valley of the Pei-kiang tributary of the Si-kiang, which is in a line with that of the middle and lower Siang, is being utilised. The Yuen-kiang, the chief stream of western Hunan, is of much less use for navigation than the Siang, but its valley provides a route pointed almost directly towards Yunnanfu and may in the future be utilised for a railway connecting this south-western focus of China with the Central Basin.

Below "Wu-Han" the Yang-tze receives only one important tributary, the Kan-kiang flowing into it from the south through the Poyang Lake. Kiukiang, at the confluence, is the outlet of the so-called "Ambassadors' Route" from Canton, the second of the two great ways from the Si-kiang to the Yang-tze; it may also eventually be the terminus of a railway from Fuchow, that is from the important coastal region of Fukien, following the Min-kiang Valley and crossing the plateau into the Kan Valley at or above Nanchang. But as a focus of routes Kiukiang may be regarded largely as a feeder of "Wu-Han," which, as we have seen, is centrally placed in relation to the twin basins of Hupeh and Poyang.

The significance of this wonderful convergence of natural routes upon the Central Basin is of course immensely increased by the fact that Hankow, although six hundred miles from the mouth of the Yang-tze, is a seaport in the sense that it can be reached in summer by ocean-going steamers. Since under the conditions of modern commerce there is an undoubted tendency for the meeting-point of land-borne and sea-borne merchandise to be located as far inland as possible, it is clear that Wu-Han has almost unique advantages as a collecting and distributing centre, the nearest parallel to it being perhaps Chicago. It would be dangerous to hazard any prophecies as to the extent to which Hankow in the future is likely to usurp some of the functions at present served by Shanghai, but as the seaport having the best communication with all parts of the interior it seems almost inevitable that it should some day become the chief trade-centre of China.

An immense impetus will be given to its growth by the establishment of better communications with Szechuan. Modern commerce is too greedy of trade to allow the Yang-tze Gorges, formidable though they are, to withhold indefinitely from its control a market of fifty millions of people, inhabiting a region which has much to give as well as much to take. Notwithstanding financial difficulties and troubled political

conditions, the last few years have witnessed the beginning of several attempts to supplement and eventually to supersede the historic and infinitely laborious system of junk haulage over the famous rapids. The remedies are two. The first is to establish rail connection between Hankow and Chungking. The engineering difficulties are of course immense, and the proposed line has been significantly styled "The Forty-Years Railway." The second is to establish regular steam navigation above Ichang, partly by the use of specially constructed boats, partly by improving the bed of the river by methods similar to those employed at the Iron Gates of the Danube. In 1912, the year after the first Chinese Revolution, the Szechuan Steam Navigation Company was founded, and on a very limited scale the passage is now being actually made by steamboats during the summer months. One of the latest enterprises is a Japanese project to place twenty-five steamers on a regular service from Ichang to Chungking.

To summarise the wider space-relationships of the Wu-Han cities: they lie almost in the centre of China Proper at the head of navigation for ocean steamers and at the point where the premier north-south trunk railway will cross the great lateral waterway of the Yang-tze, in the heart of a rich basin which is the natural focus of routes from almost all the important peripheral centres.

We can now examine some of the local details of the site of "Wu-Han," and the characteristics of the three cities which compose the unit. Reference has already been made to the line of heights separating the Hupeh from the Poyang portions of the Central Basin, through which the Yang-tze cuts its way between Wuchang on the right and Hankow-Hanyang on the left bank. These heights on the southern side form a steep and narrow ridge which divides the city of Wuchang into two almost equal parts. Under the name of the Serpent's Ridge it has long been famous, and it is of considerable strategic importance, as it dominates Wuchang and a considerable stretch of the Yang-tze. The Chinese Revolution of October 1911 began with a mutiny of troops in the barracks at Wuchang, and one of the first moves of the revolutionaries was to seize and fortify the Serpent's Ridge. Remains of entrenchments, field-pieces, etc., can be seen in the photograph of the ridge (see Fig. 3) which was taken in April 1913, about a year and a half after the outbreak. On the left bank of the river the ridge is continued by the line of heights overlooking the Han, and this was the scene of the fiercest fighting between the imperial and revolutionary troops, the principal objective of which was the important arsenal of Hanyang.

A characteristic story is told of the Serpent's Ridge which illustrates the curious blending of intelligence and superstition in the Chinese character. The Viceroy of Hupeh at the close of the nineteenth century was the celebrated Chang Chih-tung. He was one of the most famous of the Chinese *literati*, and a Confucian scholar of the first eminence, with a distinctly low opinion of European culture and morals. But he was a man of progressive tendencies, who keenly realised the imperative need of reform if China was to be saved from foreign control, and he was the author of a book (*China's Only Hope*) which created a great impression at

a time of profound humiliation and depression.[1] Among many projects of reform which Chang Chih-tung inaugurated in the Wu-Han district during his viceroyalty was one of blasting a road through the Serpent's Ridge to connect the two separated districts of Wuchang. The work had made considerable progress when the Viceroy developed an obstinate carbuncle on his neck which the Chinese doctors ascribed to the fact that the new road had cut down into the neck of the serpent and was pressing upon his backbone. Whereupon Chang Chih-tung ordered the road to be filled in again. This was accomplished at great expense, and the appeased serpent then allowed the viceregal neck to heal. At the time

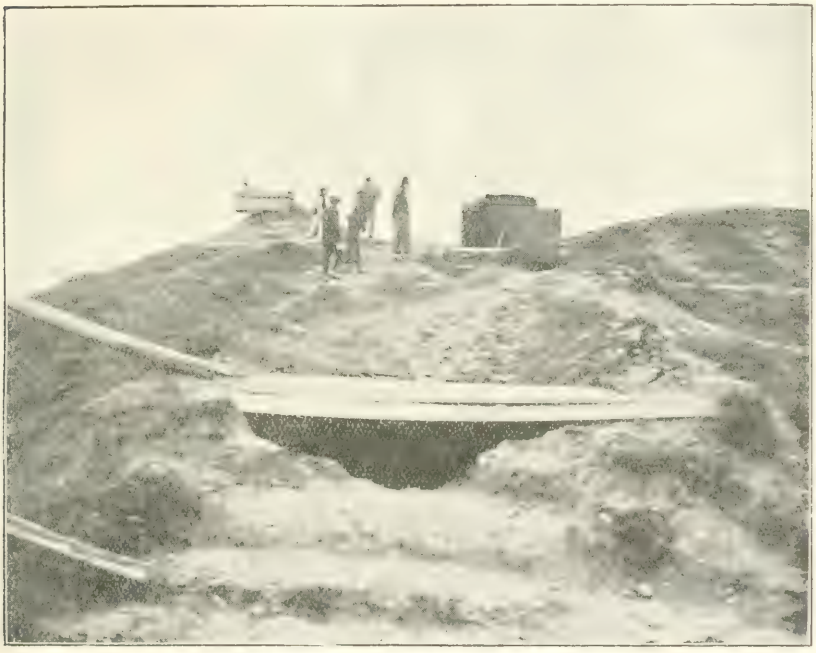


FIG. 3.—The Serpent's Ridge, Wuchang.

of my visit the road was being re-excavated, and the work was nearing completion.

Of the three "Wu-Han" cities, Hankow, with its Bund and foreign concessions, may be described as the commercial, Hanyang as the industrial, and Wuchang as the administrative, and also as the intellectual

[1] It was largely due to Chang Chih-tung, and also to the viceroy at Nanking, that the Boxer Rebellion of 1900 did not spread to the Yang-tze valley. In conjunction with Li Hung-Chang, then viceroy of Kwantung, they refused to obey the instructions of the Empress-Dowager that all foreigners should be massacred. To Yuan Shih-K'ai belongs the credit of checking and suppressing the movement in Shantung, the province where it chiefly originated. Yuan is said to have summoned the leaders to his yamen, and to have informed them that he was much interested to learn that through magic they were bullet-proof, and that he wished to have ocular demonstration of this phenomenon!

centre. The chief focus of native activity is the lower course of the Han river and its turbulent junction with the Yang-tze. A trip on a boat down the Han to the Bund at Hankow is a fascinating experience, and gives one the most vivid impression of the amazing vitality of Chinese life. For a distance of three miles on both banks of the river rises a perfect forest of masts, and the junks are packed in such serried ranks that one wonders how those farthest away from the main current can ever be extricated (Fig. 4).

A practised eye can distinguish their place of origin, and the kind of merchandise which they probably carry. A large number have come

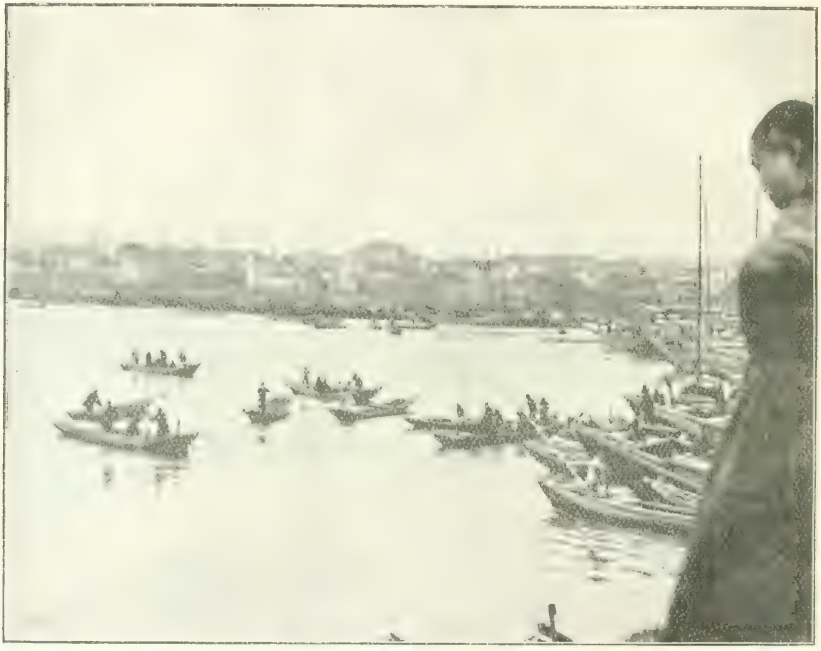


Fig. 4. The Han at Hankow.

down from the Upper Han, bringing bean-cakes, melon-seeds, drugs, and dates from the north-west: others ply between Hankow and the populous districts round the shores of the Tungting Lake and the banks of its tributary streams, serving, amongst other things, the important tea-trade of Hunan. Others again have come up from the river ports of the Lower Yang-tze, and some from the far-off seaports of Fukien and Chekiang. Some have made the formidable passage of the Yang-tze Gorges from Szechuan, and often the tattered condition of the sails bears witness to the rough weather which they have encountered (Fig. 5).

No less animated are the banks of the river. At frequent intervals are landing-stairs (Fig. 6) giving access to the city. These and the narrow passage-ways between the houses and the river[1] are swarming with

[1] A large part of Hankow was burnt down during the revolution of October 1911.

people: long files of coolies, carrying huge burdens on bamboo poles across their shoulders, uttering incessantly a low rhythmical note between a grunt and a chant, which somehow symbolises that patient, enduring cheerfulness which is one of the most striking and persistent characteristics of the Chinese labourer; mechanics and craftsmen hard at work in the open air, or in shops and workshops whose whole interior is characteristically exposed to the public gaze: customers bargaining for their purchases at the top of their voices, and a goodly sprinkling of beggars who follow their trade with the usual Chinese tenacity. The scene is indeed indescribable. In comparison with this teeming hive of

FIG. 5.—Junks on the Han.

humanity, the wharves and docks of a commercial seaport in the west seem almost quiet and peaceful.

All this belongs to the Old China, and scenes like this have been enacted on the banks of the Han from a time long prior to the coming of the first European trader. But intermixed with these characteristic sights and sounds are others which bear witness to the development of new activities that must eventually revolutionise the economic and social life of the country. Almost opposite the landing-stairs, illustrated in Fig. 6, rise the chimneys of the Hanyang Iron and Steel Works, the first and so far almost the only enterprise of its kind in China. To the Viceroy Chang Chih-tung they owe their inception and equipment with modern western machinery, mostly of British manufacture, but to him also is said to be due the cramped and rather inconvenient site,

selected on the advice of necromancers. Both the coal and the ore are brought from considerable distances, the former mostly from the Pinghsiang mines, the latter from Tiehshanfu, both in the province of Kiangsi. Notwithstanding the difficulties, physical, economic, and to some extent political, which have been encountered in running the works, their success has been sufficient to show the high industrial possibilities of the district, and the products have even reached the New York market in spite of high transport and tariff charges. Not far away are the important Government arsenal, powder factory, and chemical works. There is indeed a great variety of factories both in Hanyang and also across the

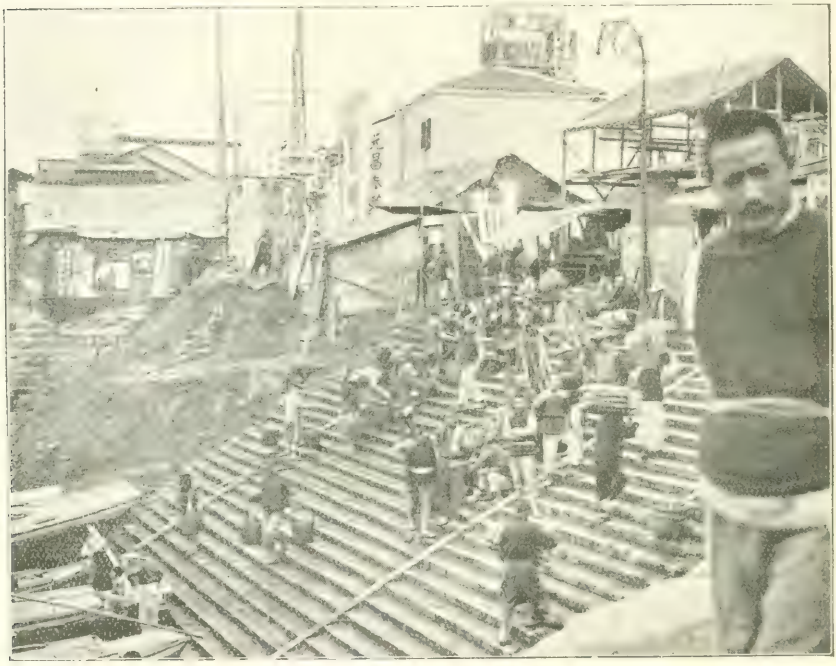


Fig. 6.—Landing-stairs on the Han.

Han on the outskirts of Hankow, the approach to which from certain sides is strangely suggestive of South Lancashire. A list, by no means complete, of industrial enterprises of the western type, includes the following:—

Oil Mills (9).
Albumen Factories (7).
Aerated Water Factories.
Distillery.
Ice and Cold Storage Factories (3).
Paper Mills.
Rice Mill.
Saw and Wood Working Mill.
Hanyang Nail and Needle Factory.
Soap Factory.
Match Factory.
Tea Factories (3).
Tobacco Factory.
Hydraulic Press.
Packing Factories.
Engineering Works.

In addition there are Electric Light Works, and also well-equipped Waterworks, undertaken and maintained by the Chinese Chamber of Commerce, and one of the most successful native enterprises in Wu-Han. The water, pumped up from the Han, passes through an elaborate system of filters. Except for one day the works continued in operation through the whole period of fighting in Wu-Han in the autumn of 1911. It is noteworthy that the mechanics employed in these and other works in Hankow and Hanyang are chiefly southern Chinese, especially Cantonese and Ningpoese. As a rule the men from the southern coast provinces are far ahead of the Hupeh people in adaptability to western industrial and commercial methods.

Many of the industrial concerns enumerated in the list given above are under foreign management. The question of the future control of large-scale industrial undertakings in China is too big and complex to be discussed here, but it is at a place like Hankow that one realises how serious a problem it is, perhaps the most difficult of all the grave problems which the Far East presents. Sometimes it is put before one as a dilemma, the two horns of which are foreign control, with its accompaniments of international jealousies and discord, and native control, with corruption and mismanagement in its train. But it is at any rate a hopeful sign that here and there, even under the present troubled conditions of public life in China, occur conspicuous instances of well-managed large-scale native undertakings.[1] It is a good omen too that the merchant class, which enjoys a world-wide reputation for probity, and which has always been a steadying influence in Chinese life, is growing in power and in popular estimation. But the fact has to be faced that the industrialisation of China must inevitably involve immense economic, social, and political problems affecting the peace and the welfare of the peoples of the West as well as those of the teeming millions of the Celestial Land itself. Their solution depends to no small extent upon the spirit which animates the nations most deeply concerned in the economic progress of China. The development of satisfactory trade relations with her depends on other than purely economic factors. This is a truth which Europe, and not least Great Britain, is slow in learning. She has regarded China too exclusively as a market to be exploited, largely oblivious of the lesson which her own industrial revolution might have taught her that the ultimate success of economic development depends on the social changes which accompany it. The slow transformation of Chinese society, inevitably implied in the economic upheaval now in progress, creates educational problems which no western nation with important interests in China can afford to ignore. To a large extent of course these problems must be faced and solved by the Chinese themselves, but it is idle to pretend that they can altogether dispense with the help of the nations which are themselves chiefly responsible for their existence. If in fact there is to be successful intercourse in trade between East and West, then it is not in trade alone that intercourse must take place.

[1] One of the most interesting is the case of the Kalgan Railway, constructed and maintained entirely by Chinese engineers.

This brings me to the function which Wuchang may serve in the future development of "Wu-Han." Wuchang is the intellectual centre of the triple group of cities. It is the seat of Government, and a place with strong literary traditions, already possessing numerous schools and colleges. It is a well-built city, and as seen from the Serpent's Ridge presents a pleasing appearance (see Fig. 7). It shares to some extent in the general industrial development of Wu-Han, but its streets are quieter and more restful than those of Hankow and Hanyang, and their distinguishing feature is the large number of booksellers' shops. Is it too much to hope that Wuchang is destined to supply the

FIG. 7.—Wuchang and the Yang tze from the Serpent's Ridge.

intellectual and spiritual forces which are needed to animate the growing consciousness of Wu-Han as one of the greatest centres of the world's trade? Here where East meets West in the very heart of China is a city which might well become the seat of a great university, whose special mission it would be to harmonise Eastern and Western culture, and to bring into living contact all that is best in the philosophy and thought of China and of Europe. A scheme somewhat on these lines was presented to the British public a few years ago, but met with signally little response.[1] It may be that if it is revived a few years hence, it

[1] I allude to Lord William Cecil's scheme for the establishment of a University under British auspices in Central China either at Hankow or Wuchang. The appeal was made primarily to the British public, but the Government was approached by an influential committee with regard to a grant-in-aid from the Boxer indemnity which China is paying to

will appeal with new meaning to a people whose consciousness and imagination are being quickened by the poignant experiences of the present time to grasp the true meaning of the issues which hang upon international relations. No greater contribution could be made towards the solution of the pressing problems which the industrialisation of China, as typified by the expansion of "Wu-Han" will inevitably force upon the world.

THE AULD WIVES' LIFTS—A PSEUDO-MEGALITHIC TOR.

By Professor J. W. Gregory, D.Sc., F.R.S.

(*With two Figures.*)

The Auld Wives' Lifts is a pile of three huge stones in the form of an arch on Craigmaddie Muir, near Glasgow. It has been generally regarded as a megalithic trilithon or cromlech, erected by people of the race which erected Stonehenge, such cromlechs as Kit's Coty House, and the standing stones which are still numerous in Scotland. D. Wilson, for example, in his *Pre-historic Annals of Scotland* (1863, p. 93), calls it "One of the most celebrated Scottish cromlechs." It was figured and described in 1793 by D. Ure (pp. 85-87, pl. opp. p. 85), who explained its origin as a Druid's altar. He related the ancient tradition that "three old women having laid a wager which of them would carry the greatest burden, brought in their aprons the three stones of which it is constructed, and laid them in the position in which they are now found." He also reported the superstition that through the opening between the stones "every stranger who visits this place for the first time must creep, otherwise he shall die childless." Ure attributed the story of its origin to "the Druidesses who might at this place superintend the sacred rites."

The view that the Lifts is artificial is adopted, amongst others, by

this country. The refusal of the Government was based partly on the ground that a British University had already been established in Hong Kong. Useful as this institution certainly is, it is far too remote from the Yang-tze valley materially to influence the situation in what is after all the most important sphere of British interests in China. But the main ground of refusal was the indifference of the British public to the scheme. The fact is not, I think, sufficiently realised in this country that the United States remitted a considerable proportion of its Boxer indemnity for the purpose of establishing a large and well-equipped college outside Peking, the main object of which is to train Chinese students for the American Universities. During the last few years America, Japan, and Germany have devoted large sums of money and great energy both to educational projects in China itself and to the work of strengthening the connection between Chinese students and the home Universities. In both these respects Great Britain has lagged a long way behind these countries. This indifference seems to be singularly short-sighted from the point of view of our own commercial interests, since Chinese students who afterwards become merchants, manufacturers, or engineers naturally tend to build up a trade connection with the country under whose auspices they have been trained. It is to be regretted too on higher grounds, since, as I have argued elsewhere (*Report to Trustees of the Albert Kahn Trust*, 1914) Great Britain is in some important respects better qualified than any other country to help China in the solution of the critical educational problems with which she is now confronted.

Wilson (1863, p. 93), Nimmo (1880, vol. i. p. 56), H. M'Donald (1856, pp. 368-371), and G. E. Todd (1898, pp. 2-3). The last author remarks that "Probably no better example exists of the rude stone altar of Druid times." The Lifts stands in a flat floored depression which, following Ure, has generally been stated as 250 yards in diameter. The width east and west on a line through the Lifts is about 130 yards. Mr. Todd represents this basin as excavated by the people who arranged the stones. It is, he says, "evidently, from its regularity and its level surface, the work of human hands" (p. 3). A suggested glacial origin of the structure is referred to by Dugald Bell (1881, p. 66).

The Auld Wives' Lifts stands on Craigmaddie Muir, on the hills to the north of Glasgow. It is on the estate of J. Bartholomew, Esq. of Torrance, and is about 400 yards north of North Blochairn farm. It is a little over two miles north-east of Milngavie Station. It is at the height of about 580 feet above sea-level. According to Wilson, "a spectator standing on it can see across the island from sea to sea; and may almost at the same moment observe the smoke from a steamer entering at the Firth of Clyde, and from another below Grangemouth in the Forth" (Wilson, *op. cit.* p. 93).[1]

The essential features of the Lifts indicate that it is a natural formation. The stones are all of the local Carboniferous sandstone. Wilson stated that the capstone consists of basalt, but this statement is incorrect. The sides of the depression around the Lifts are formed of similar sandstones. The capstone, which is 19 feet long by 13 feet wide by 7 feet thick, is a falsebedded sandstone; the true bedding planes in it are almost horizontal. Each of the two supporting stones consists of an upper layer, about 2 feet 9 inches thick, of a well bedded sandstone with many small quartz pebbles, and of a lower layer of fine grained massive sandstone, of which 4 feet 3 inches is exposed in the eastern stone and 3 feet 9 inches in the western stone. The agreement in character between the two supporting stones show that they were originally part of one mass of sandstone. The bedding planes in both the supporting stones dip westward about 25°. The cliff of sandstone to the west of the Lifts (Fig. 2) consists of 3 feet of pebbly sandstone resting on 15 feet of falsebedded sandstone similar in character to the capstone: and at the foot of the cliffs is a layer about a foot thick of pebbly sandstone similar to that forming the upper part of the two supporting stones. Similar rocks to the Lifts can be seen also in the northern and eastern slopes of the depression. The Auld Wives' Lifts consists then of three blocks of the local sandstone still in their relative positions (Fig. 1).

The origin of the Lifts probably began by the excavation of two valleys which cut into the sandstone plateau, and left a ridge trending north and south across the amphitheatre. This ridge was then cut across by the meeting of the branch valleys to the north of the Lifts. A boss of sandstone was thus left in the centre of the depression. The boss was gradually reduced by wind, rain, and weather to a sandstone

[1] I have not been able to confirm this statement, as on my visits to the locality the weather has not been clear enough to allow either coast to be seen.

tor. Further weathering decomposed the soft layer between the capstone and the underlying pebbly layer. The readiness with which this layer is worn away is shown by the cave formed by its decay on the northern side of the amphitheatre. Meanwhile the foundations of the pile must have been weakened by denudation and the two supporting stones slipped westward. A similar slip has formed the miniature whangie, a cleft beside the cave in the north-eastern bank of the amphitheatre, 60 yards north-east of the Lifts. The capstone sank into the

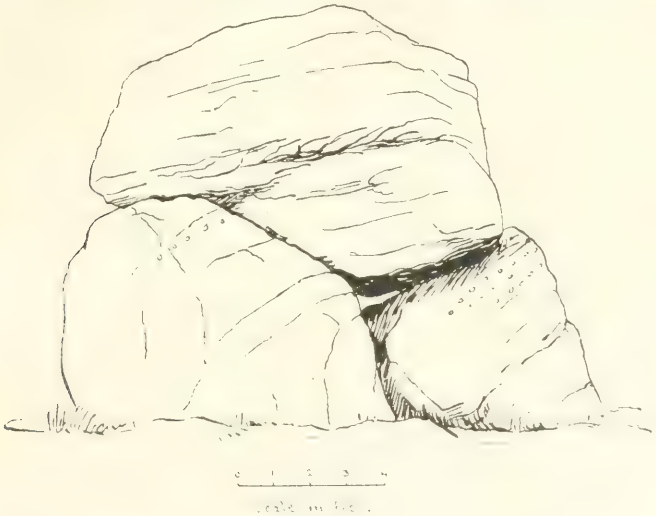


FIG. 1.—The Auld Wives' Lifts.

FIG. 2.—Section across the Auld Wives' Lifts showing the relation of its sandstone to those in the adjacent banks.

Vertical Scale—1 inch=50 feet. F.S.=False-bedded Sandstone.
Horizontal Scale—1 inch=100 feet. P.=Pebbly Sandstone.

hollow formed by the separation of the two supporting stones. That the capstone originally rested on the horizontal surface of the supporting stones is shown by the correspondence in the irregularities of their surfaces. About two feet from the southern edge of the eastern supporting stone is a slight elevation which corresponds to a depression on the under surface of the capstone. A step on the eastern supporting stone no doubt once fitted into the corresponding notch on the under surface of the capstone. The surfaces are of course a good deal worn by the weather, but sufficient of the original surface is still left to show that the irregularities on the top of the eastern supporting stone are the counterpart of those on the bottom of the capstone. Similarly the opposite

faces of the two supporting stones are also counterparts, showing that the gap between them was formed by their movement apart.

The arrangement of the three stones in the trilithon can be explained without any appeal to the action of man. The formation of tors by the weathering of sandstone and granite is a common phenomenon, and the blocks assume various forms and arrangements. The sandstone around the Auld Wives' Lifts show clefts due to the widening of joints, the slipping of loosened blocks, and the irregular weathering of the rock along both vertical joints and horizontal bands of weak stone. I have seen many of the cromlechs in England and Brittany, but the Auld Wives' Lifts is unlike any of them. It may be regarded as a pseudo-megalithic tor.

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AOGASHIMA.

By W. B. Mason, Corresponding Member.

(*With an Illustration.*)

The island of Aogashima, though not included in the "Seven Isles of Izu," comes under the same jurisdiction.[1] It lies some 34 miles to the south-west of Hachijō, the most southerly member of the group. In olden times it was known as Oni-ga-shima, or "The Isle of Demons," the natives having the reputation of being black and hairy, and wearing leaves of trees for clothing. The stay-at-home Japanese tell you that they still differ physically from the inhabitants of the mainland, but I cannot say that I noticed any marked variation from the normal type.

Aogashima, as seen from the sea (see figure), is a rocky mass, rising almost sheer from the water's edge, its sides covered with scrub except where the rain has washed away the surface soil. Avalanches of rock and earth from the precipitous slopes are of constant occurrence. There is no coastal indentation large enough to accommodate an ordinary junk; and

[1] These islands stretch away for 120 miles in a southerly direction from near the entrance to Tokyō Bay to 33° lat.

being exposed to the full sweep of the broad Pacific, the island is, in consequence, rarely touched at by the steamers of the Nippon Yusen Kaisha which pass it by on their monthly run between Yokohama and the Bonin Islands. The boat I travelled by in the month of July last lay about half a mile from the landing-place—a few feet of rocky shore upon which a number of men stood ready to grasp the boats sent from the steamer whenever a favourable roller carried them in near enough. The boats with their cargoes are then hauled out on to planks placed at the foot of the cliffs. Thence a narrow path zigzags to the top; but, indeed, all the island paths are so rough and narrow that most goods, as in Hachijō and Ōshima, have to be carried on the head. In other places, ladders and timber supports take one from the shore to the summit.

Aogashima is about 1½ mile from east to west, and 1 mile from

The Island of Aogashima, as seen from the sea.

north to south. The central portion is a depression, doubtless the remains of an ancient crater, for the island forms a link in the volcanic chain which extends from Fuji to the Volcano Islands in the south seas. According to the records, the period of greatest seismic activity in modern times lasted from 1780 to 1785, in which latter year a violent eruption ruined all the arable land, killed most of the people, and drove those who escaped, numbering two hundred, to the neighbouring island of Hachijō. For over fifty years the inhabitants were exempted from taxation; but the island was again re-peopled in 1834, and taxes have been imposed since 1840. In 1870 an earthquake caused a small island to rise from the sea, 25 miles south-east of Aogashima. At a spot called Ike-no-sawa steam issues from the ground, in which the natives enjoy a hot bath.

In the depression or valley referred to lie the hamlets, whose inhabitants are chiefly occupied in farming on a small scale. The women find some employment in rearing the silkworm. No great amount of

fishing is possible; in summer and autumn, when the weather is exceptionally fine, these people venture out in search of the bonito. Large quantities of flying-fish are shipped from the island. Here, as at Hachijō, the natives dive into the sea and spear fishes, the spears being often 10 feet long, the handles made of the wood of the betel-nut palm. They are in and out of the water at this task the greater part of the day. Nets are used chiefly for catching the flying-fish. Gigantic crabs —from 3 to 5 feet in length—are occasionally found in these waters.

The climate is hot; and, doubtless, owing to the proximity of the *Kuroshiwo*, or Japanese "Gulf-stream," frost and snow are never seen. The latest statistics available give the population at about eight hundred.

GEOGRAPHICAL NOTES.

Europe.

The Albanian Coast and its Fisheries.—We have received a copy of Memoir XL of the R. Comitato Talassografico Italiano, which, though it bears date 1914, has only reached us recently, and deals with the development of Albanian fisheries. The subject is of some general interest, for the Committee appointed to investigate the question find that the fisheries are both rich and capable of great development. Their conclusions, published not very long before the outbreak of the war, are bound to affect the attitude of the Italian Government towards the Albanian question generally, and thus may have political significance.

The pamphlet, which contains some interesting reproductions of photographs of Albanian coast scenes, is divided into two sections, one dealing with the economic aspect of the subject, and the other with the biological. Stress is laid in the first place upon the fact that Cape Linguetta or Glossa divides the Albanian coast into two parts, a northern and a southern. The former extends to the mountains of the Bojana, and is characterised by its flat, marshy nature, the coast being fringed with banks, like the Venetian *lidi*, which bound lagoons, and having also littoral swamps and lakes, while the southern part, which extends to the Greek frontier, is steep and rocky. Many rivers enter the sea in the northern part, and as the strong Adriatic current is deflected by the promontory of Cape Linguetta, the detritus brought by the streams is spread over the sea floor, and erosion is at a minimum. All the conditions, therefore, favour both a rich fish fauna and a prosperous fishing industry, which could be carried on with comparatively simple equipment, and without the risks of lost gear which are so great on the rocky Dalmatian coast. Navigation in the ordinary sense is not easy, on account of the constant silting up of the harbours, but the conditions favour a fishing population, just as they do on the quite similar Venetian coast. The Albanian population, however, shows no aptitude for the fisher's life, and fishing is carried on only on a very

small scale, and with very primitive equipment, principally in the lagoons and not in the open sea. There is, therefore, a considerable opening for Italian fishers, and a certain number of Italian boats visited the coast prior to the Italo-Turkish war. But the industry was carried on at considerable risk, for the nets and boats were always liable to confiscation by the Turkish authorities. At the time when the Memoir was written the Italian boats had practically disappeared, for no arrangement had been come to with the new Albanian Government. As already suggested, it is probable that a regularisation of the fisheries question will be insisted upon by the Italian Government at the great settlement after the present war. The fish include all the species found in the Adriatic generally, with the exception of the crustacea, and though the flavour does not seem so good as that of the forms caught in the clearer waters off the Dalmatian coast, the size of the individuals and their abundance compensates for any deficiencies in this direction. Oysters were taken by the members of the Committee in the Bay of Valona, and it is probable that oyster cultivation could be carried on there, as well as possibly on other parts of the Albanian coast.

Geography and the Campaign in Russia.—In continuation of his articles on geographic aspects of the war (cf. this *Magazine*, vol. xxxi. p. 269), Professor D. W. Johnson describes in the February issue of the *Geographical Review* the Russian retreat in 1915. The article is illustrated by some clear sketch-maps, and is very detailed in nature, dealing in succession with the various stages of the retreat, and the part played by the rivers and marshes of western Russia in determining the movements of the two armies. Special attention is devoted to the German attempts to attain the Riga-Dvinsk line, and the map which illustrates this section is admirably clear. In essence Dr. Johnson's conclusion is that German advances in the east have been attained by using very heavy artillery to batter down the resistance of the lighter Russian guns. Thus marshy country, where the use of the German artillery is restricted to the narrow front offered by a railway embankment or causeway, has been unfavourable to the Germans, and the success of the Russian retreat was due to the skilful way in which the numerous marshes and swamps were utilised. Dr. Johnson lays great stress upon the importance of the marshes which lie to the west of the Dwina, which have enabled the Russians to resist all German attempts to take either Riga or Dvinsk, in spite of repeated and costly efforts. The article is illustrated by some striking photographs, as well as by the sketch-maps, and is remarkable for its warm appreciation of the skill shown by the Russian commanders in the course of the retreat.

Asia.

The Re-stocking of Krakatoa after the Eruption.—Dr. Edmond Bordage contributes to the *Annales de Géographie* for January 15 an interesting summary of a number of papers which have appeared upon the new fauna and flora which have peopled Krakatoa since the de-

structive eruption of 1883. Prior to that date the three islands which are collectively designated as Krakatoa were clothed with thick forest. The outburst covered the surface with burning "ash" and hot pumice to a depth varying from six to nearly two hundred feet, so that it seems justifiable to assume that every plant and animal, every egg and seed and root-stock were destroyed. The vicinity of the islands to the famous Botanical Garden at Buitenzorg made it possible to study the gradual re-stocking in detail, and the result has been to confirm Darwin's conclusions as to the part played by ocean currents, wind and birds in the distribution of plants and animals. The first sign of new vegetation was a slimy covering of simple algæ, which developed on the surface and in the hollows of the pumice blocks, and prepared a nidus in which wind-borne spores of mosses and ferns could germinate. The ferns flourished and prepared the surface in their turn for flowering plants. Up to 1906, the last year in which a complete botanical survey of the islands was made, 114 plants had been recognised as present.

The new flora shows a definite arrangement in zones, and differs notably from the original flora. The belt nearest the sea is characterised by the abundance of an Ipomæa (Morning Glory or Convolvulus), which creeps over the shore. Mingled with this dominant plant are some leguminous plants, grasses and sedges, with some coco-nut trees, screw pines (Pandanus), a Hibiscus, and other shrubs. In the next zone the predominant plant is a tree of the Myrtle family (Barringtonia), characterised by its mitre-shaped fruits. The tree is mingled with a number of other trees, and the whole belt, in which creepers are represented by a vine, and parasites by a member of the laurel family, represents the beginnings of an impenetrable forest. In the centre of all three islands is a third zone, a kind of steppe, formed by grasses, sedges and ferns, mingled with many Composites, some species of Ficus, and dwarf bushes. The three zones are not sharply demarcated, and it would appear that the forest belt is encroaching upon the others, suggesting that in course of time the original forest will re-establish itself over the whole surface. A remarkable feature is the absence of mangroves, though the fruits are constantly thrown up on the beach from the neighbouring islands. As these do not seem to germinate it would appear that the volcanic soil is in some way unsuitable. All the members of the present flora grow also on Java and Sumatra, and it seems clear that they have been re-introduced from these islands. According to the careful investigations of O. Penzig it would appear that of the total number of plants 60 per cent. are due to the transport of fruits and seeds by water, 30 per cent. to wind-borne seeds, while the remaining 10 per cent. have been brought by birds.

The animals of the islands were studied in 1908 by an expedition, whose members found 263 species, the vast majority of which (240 species) belonged to the Arthropods, that is, to the insects and their allies. No mammals were collected, and it is clear that most of the animals have been introduced by means of floating wood, or by the rafts of reeds and bamboos which are borne by currents from the neighbouring islands, and thrown up in great masses on the shores. Some of the

insects may, however, have been carried by the tempestuous winds which occur in spring. The presence of an earthworm and of two terrestrial molluscs is interesting, for it is often maintained that the natural transport of such animals across the sea presents great difficulties, owing to their susceptibility to the action of salt water. It is to be remembered, however, that the distance between the islands and Java is short, only some 25 miles.

Sir Aurel Stein's Expedition.—A letter from Sir Aurel Stein, dated Dalbandin, Seistan-Nushki route, February 17, 1916, appears in the May issue of the *Geographical Journal*, and gives some further particulars in regard to his journeys (cf. p. 35). The first part of the letter is devoted to a fuller description of the journey from Kashgar to Meshed, which was reached on November 4, 1915, and the remainder to an account of the winter's work in Seistan. After a week in Meshed the explorer started for Seistan, taking little-frequented hill tracks to Ruikhaf, and then travelling south in an almost straight line parallel to the Perso-Afghan border till the high road was struck at Bandan, two marches from the capital. A careful plane-table survey of the whole route, 500 miles in length, was made by the surveyor, Afrazgul Khan, on the scale of four miles to an inch, and despite the disturbed conditions in Persia no great difficulties were encountered. On the slopes of the Koh-i-Khwaja hill, which rises above the terminal marshes of the Helmand, the remains of a large Buddhist sanctuary were found, while in the desert further to the south, in an area once watered by an abandoned branch of the Helmand, prehistoric potsherds, together with stone implements, mainly of Neolithic Age, were found, as well as some Bronze Age relics. Another interesting discovery was the finding of a close line of ancient watch stations stretching across the desert from the southernmost Hamum, or marsh, in the direction of the salt basin of the Gaud-i-Zirreh. These stations seem to date from the early centuries of our era, and to have been intended to safeguard the cultivated portion of the Helmand delta from raids of nomadic tribes from the south.

In the beginning of the present year Sir Aurel Stein returned to the inhabited part of Persian Seistan, and as it proved impossible to explore in the Afghan part of Seistan, early in February a start was made for India by the Seistan-Nushki trade route. The letter, as already stated, was written *en route*, and according to later information the explorer has now returned to London.

America.

Agriculture in Minnesota.—The University of Minnesota has published as No. 3 of its *Bulletin* an interesting monograph by Professor Edward Robinson entitled, "Early Economic Conditions and the Development of Agriculture in Minnesota," which contains both a great mass of detail and some interesting general conclusions. Minnesota contains, in the Red River valley, on the site of the glacial Lake Agassiz, some of the finest wheat-growing lands in the world, while elsewhere there are

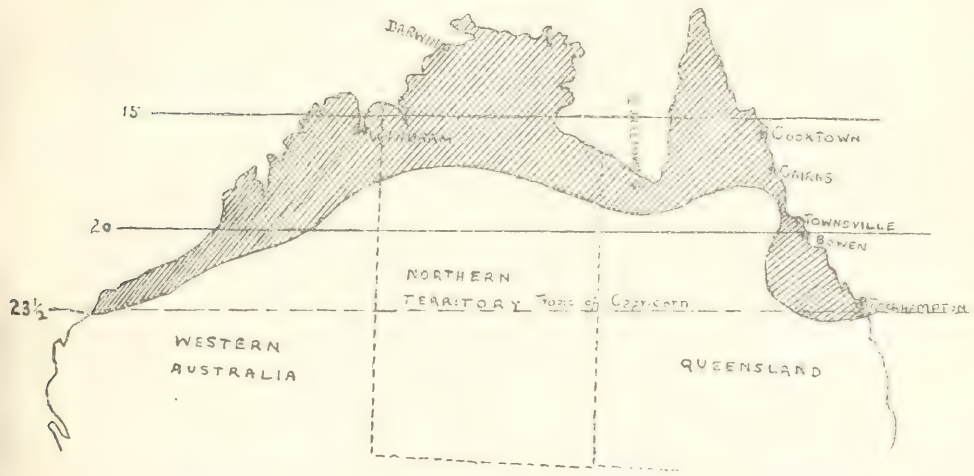
prairie regions with only moderately fertile soils, and also forested areas which require to be cleared for the plough. Thus within the state there are examples of the various conditions which occur in the New World generally, and its history is to some extent an epitome of that of the agricultural lands of America. We find, for example, that wheat as a money crop was grown on the virgin lands on the one-crop system until exhaustion supervened, and then the area under wheat decreased, many of the farmers migrating further west and into Canada, to find new virgin lands. At the same time the production of wheat decreased far less rapidly than the area under wheat, showing that with the using-up of the virgin lands and the consequent rise in prices it became possible to apply intensive methods to land which had been some time under cultivation. Professor Robinson, in a series of very interesting passages, uses the special conditions in Minnesota as a text for a discussion of the position of the farmer in the States, and of the effect of the development of the New World upon the Old.

He regards the year 1870 as marking the period when America was reacting with the greatest intensity upon Europe, while the rise in the value of farm products in 1890 marks for him the beginning of a new era, the close of the period of cheap American-produced foodstuffs. He stresses the fact that the period of exploitation of the virgin lands of the New World not only coincided with the increase of railways but with great improvements in methods of distribution, and this has induced economists to stress distribution rather than production. Further, the period of cheap foodstuffs was for the American farmer generally a period of great depression, just as it was for the European agriculturist. Professor Robinson states that at certain periods the price of American foodstuffs in Europe has fallen below the cost of production over large parts of the United States. He considers in some detail recent tendencies in Minnesota as regards land ownership and the size of farms. There is a steady diminution in the number of farms worked by the proprietors, and at the same time a tendency for the size of the farms to increase. The author indicates the reasons for this, and gives it as his opinion that the desire generally expressed by townspeople that small holdings should become numerous in country areas, with a corresponding increase in the rural population, is based unconsciously upon class selfishness. Small holdings may mean increased food production, but they also mean a low standard of living, human labour instead of machinery, the "man with the hoe" rather than the steam-plough. The attitude towards the question taken by the young members of the rural population is indicated by some striking figures which show that in a typical Minnesota township 60 per cent. of the girls, and 37 per cent. of the boys between 16 and 21 years of age, were away from home studying, teaching or working in the cities. Of boys and girls over 21, 33 per cent. of the girls and 22 per cent. of the boys were not on farms. The migration of the young women citywards, partially explained by the fact that butter and cheese making and to some extent fruit-canning have become factory instead of home industries, is a striking point, but it is regarded by the author as only one indication of the tendency for the land-owning

farmers in America to diminish in number, owing to migration to the cities. At the same time while large general farms tend to increase in size and to fall from the hands of owners into those of tenants, small farms devoted to market-gardening and fruit-growing tend to increase in numbers. Generally, however, the farmers of Minnesota are using more land and less labour as the rural population is diminishing. The proofs given that what have been regarded as purely Old World problems are also clamant even in the fertile parts of the New World is an interesting fact.

Australasia.

Climate and Labour in Northern Australia (*with Sketch-Map*).—We have received a cutting from the *Pastoral Review*, dealing with the



problem of a "White Australia," and the highly controversial question of the possibility of developing the Northern Territory without the aid of coloured workers. The article contains two points of special interest, one dealing with the climate of the region and the other with the question of the efficiency of white workers in tropical climates. In regard to the latter point, it is stated that at a meeting of sugar mill managers in Queensland, held some eight or nine years ago, one manager said that during the preceding year 40,516 tons of cane had been cut by white labour at Mulgrave by 451 whites, and 23,813 tons by 209 Kanakas. Another said that white men, cutting on the wages system, averaged 30 cwt. a day, against 3 tons by the Kanakas.

As to the climate in the Northern Territory, it is stated that in Darwin, the monthly mean of the maximum daily dry-bulb temperature never goes below 87°, and for nine months of the year keeps above 90° Fahr., while the wet-bulb average for January is 78°. Wet-bulb readings taken in a well-constructed house at Darwin in July gave the

following results:—The average for the month at 9 A.M. was 72·4°, and at 3 P.M. 80·2°. Some idea of the severity of the heat may be gained from the fact that when the wet-bulb thermometer reaches 88° work must cease, or heat apoplexy will supervene. As a comparative reading, it may be noted that the record wet-bulb temperature in Melbourne has never exceeded 75°. These figures are, it is stated, sufficient to indicate that any tract of country liable to a wet-bulb temperature of over 75° day after day and month after month is not, and never can be, fit for a white population unassisted by workers specially adapted by nature for such conditions.

The limit of an endurable climate for white men may, in the opinion of the author of the article, be taken as being a wet-bulb temperature of 75°, and the accompanying map shows that this wet-bulb isotherm, as it is called—a line drawn through all the points where the average daily reading in summer is 75°—runs across the north of Australia and some distance down the east coast, taking in all the comparatively low-lying tropical country. Within this strip indentured coloured labour from Java, the archipelago to the north of Australia, China, India, or the South Sea islands, should, the writer of the article believes, be introduced, but this labour should not be allowed to pass south of the line represented by the 75° wet-bulb isotherm. Sir George Grey proposed in 1890 or 1891 the same principle, though his boundary was a hard-and-fast line drawn along 23½° of south latitude, that is the Tropic of Capricorn, but this is said to include a very extensive area of perfectly good "white man's" land, where there is no necessity for black labour.

The writer of the article then goes on to discuss the conditions under which coloured labour might be introduced.

POLAR.

Shackleton Relief Expedition.—No news has been received of the *Endurance* or of Sir Ernest Shackleton's party, and it is feared that the vessel may be in difficulties. The following announcement in regard to the expedition appeared in the daily press on May 6:—

"A committee has been appointed to advise His Majesty's Government as to the steps to be taken with a view to the relief of the members of Sir E. Shackleton's trans-Antarctic expedition, who may now be in the Antarctic. The chairman of the committee is Admiral Sir Lewis Beaumont, G.C.B., K.C.M.G., and the other members include the hydrographer of the Navy, representatives of the Treasury and Board of Trade, the attorneys of Sir E. Shackleton, Major Leonard Darwin (representing the Royal Geographical Society), Sir Douglas Mawson, and Dr W. S. Bruce. The committee, who have power to add to their number, held their first meeting at the Admiralty yesterday, and will make their recommendations at the earliest date of which the circumstances admit."

Memorial to Captain Scott and his Companions.—On Saturday, May 6, Mr. Asquith unveiled a bronze tablet which has been

placed in St. Paul's Cathedral in memory of Captain Scott and his companions. The memorial is the work of Mr. S. Nicholson Babb, and contains a medallion portrait of Captain Scott and a panel in relief representing the Polar party on the march. The inscription is by Earl Curzon, and reads as follows :—"In memory of Captain Robert Falcon Scott, C.V.O., R.N., Dr. Edward Adrian Wilson, Captain Lawrence Edward Grace Oates, Lieutenant Henry Robertson Bowers and Petty Officer Edgar Evans, who died on their return journey from the South Pole in February and March 1912. Inflexible of purpose—steadfast in courage—resolute in endurance in the face of unparalleled misfortune—their bodies are lost in the Antarctic ice—but the memory of their deeds is an everlasting monument."

Commercial Geography.

Railway Construction in the Near East.—In connection with the sketch-map which appears in our last issue, p. 218, and the accompanying note to the effect that Persia is devoid of railways, it may be recorded that a telegram from Petrograd on May 8 announces the formal opening of the line from Julfa to Tabriz on that date. Julfa is placed on the River Aras, which marks the Russo-Persian frontier, and is connected by rail with Tiflis, and thus with the Batum-Baku railway system, which again connects with the general Russian system. Tabriz, the trade centre of North-Western Persia, lies about eighty miles south of Julfa, and it is stated that a regular service for goods and passengers is to be carried on by the new line, which thus marks the breaking down, at one point, of the commercial isolation of Persia. It is proposed to continue the Julfa-Tabriz line to Tehran, and even to connect this trunk line with the Baghdad route, but all such proposals are unlikely to materialise at present.

In regard to the Baghdad railway, a quotation from the *Hamburger Nachrichten* of April 26 has appeared in the daily press, which, though somewhat obscure, adds a few details to the account given here on pp. 193-5. According to the note, the gap where the line tunnels through the Amanus range has been filled up, this section being opened to traffic in February last. The other gap, in the region of the Taurus range, has been reduced from about forty miles to about twenty-six miles. Finally, it is stated that on the Aleppo-Baghdad section a gap of three hundred and sixty-seven miles remains. This must mean that, as surmised by the *Times* military correspondent (cf. 194), the line has not yet been continued to Nisibin, railhead being somewhere to the east of Ras-el-Ain.

NEW BOOKS.

EUROPE.

East Lothian. By T. S. Muir, M.A., F.R.S.G.S. Cambridge University Press, 1915. *Price* 1*s.* 6*d. net.*

This is one of the admirable Cambridge series which dissect a county in the most scientific and thorough manner. Nothing of importance in East Lothian

seems to have escaped Mr. Muir. Besides its history, natural features, agriculture, industries, antiquities, etc., he devotes some pages to its Place-names, with a map indicating whether a Place-name is of Gaelic, Pictish, or unknown origin, all other names being Teutonic. Of Gaelic Place-names we note Dunglass, Barness, Catcraig, Doon, Brox, Dunbar, Dove, Tantallon, Car, Leithies, Craigleith, Tarbet, Gullane, Balgone, Wamphray, Invereil, Strabauchlinn, Drem, Kilspindie, Craigie, Ballencrieff, Cockenzie, Goul, Macmerry, Kilduff, Garvald, Deuchrie, Monynut, Danskine, Faseny, and Killpallet. The author derives Belhaven, near Dunbar, from the Gaelic *baile na h-aibne*, "village on the river." Mr. Johnston in his "Place-names" prefers deriving it from old French and English words signifying "fine haven," as he says Gaelic names are rare here ; but, as the foregoing list proves, Mr. Muir finds that they are numerous in East Lothian. Excellent orographical and geological maps of the county make this volume very complete and wonderfully cheap.

The "Times" Book of Russia: Finance, Commerce, and Industries. With an Introduction by Sir DONALD MACKENZIE WALLACE. London : The *Times* Publishing Office, 1916. *Price 2s. net.*

This is a useful little book, based upon material which has appeared in the *Times* Russian Supplement, revised and brought up to date. It contains seven clear and simple maps, and, though intended primarily for the business man and financier, contains much of geographical importance in regard to the resources of the country. We may note specially the treatment of trade routes, which is clear and full. It is stated that, so far as goods traffic is concerned, the Baltic as an outlet might to a considerable extent be replaced by the White Sea, provided the ports of the latter and the roads leading to them were properly equipped, or by the new ice-free port on the Murman coast, as soon as this is connected with Petrograd by rail. On the other hand, nothing can replace the free passage through the Dardanelles, and the frequency, in recent years, of arbitrary stoppages of the Straits by the Turkish authorities has made guarantees against this not merely a matter of political ambition, but one of paramount necessity to the Russian State. Before the war more than fifty per cent. of the Russian waterborne exports left the country by the Black Sea and Sea of Azov ports.

Another interesting subject discussed is that of cotton-growing within the Russian empire. Two main areas are devoted to this crop, these being parts of Russian Turkestan and Trans-Caucasia. These constitute the most northerly cotton-growing regions of the world, and it is interesting to note that the land is mostly in the hands of small farmers, who either own it or hire it according to various schemes of profit-sharing. Little machinery is employed, and this although the cost of the hand labour used is high, about 5s. a day. The total area at present under cotton is probably about 1,250,000 acres, and the yield is very high : 300-450 pounds of lint per acre, as against 200 pounds in America and 100 pounds in India. American Upland cotton has been introduced with success, but the climate is too dry for Sea Island cotton. Irrigation is necessary, owing to the scanty rainfall, and large Government schemes are in hand. It is interesting to note that the home supply of the raw material has prevented the Russian cotton industry from suffering so severely from a shortage of supplies since the outbreak of war as it would otherwise have done, the 1914 crop having been the largest on record. In regard to other raw materials, we can only note that it has been found impossible to grow jute within the empire, but the imported jute is exercising an unfavourable influence on the home production of hemp, which is decreasing, partly because of the want of scientific method in the cultivation of the crop. These notes will serve to show

that the book is well worth careful study by the geographer, no less than by those for whom it is primarily intended.

The Growth of a Scottish Burgh: A Study in the Early History of Dumfries. By G. W. Shirley, F.L.A. Dumfries: Privately printed, 1915. *Price* 1*s. net.*

This brochure, reprinted (with some slight alterations) from the Transactions of the Dumfriesshire and Galloway Natural History and Antiquarian Society, of which Mr. Shirley is the Hon. Secretary, contributes much to our knowledge of the early history of Dumfries. It is a serious and able contribution to burghal history in general. Few, if any, have the intimate acquaintance with Dumfries necessary to one who would attempt a review of the little book. The reviewer lays claim to no such acquaintance, but he can appreciate the skilful marshalling of facts, the logical deductions, and the erudite notes. The figures are most helpful, and may be supplemented in a future edition by a contoured and coloured map of the Dumfries area. We welcome the small volume, and hope we are right in regarding it as an earnest of later work from Mr. Shirley's pen.

My Holidays on Inland Waterways. By P. Bonthron. London: Thomas Murby and Co., 1916. *Price* 4*s.* 6*d. net.*

This volume, with its seventy-four illustrations and map, is a description of 2000 miles of cruising by motor-boat and pleasure skiff on the canals and rivers of Britain. The author, as a member of the British Motor-Boat Club, has the qualifications which demand a hearing. There is here no attempt at style—in fact the narrative is somewhat bald—but we get to learn a great deal about our rivers and canals, especially about the latter. There are excellent photographs. We doubt if it is within the monetary reach of all members of the Motor-Boat Club to follow Mr. Bonthron's example. An indication of each day's outlay would have been a most serviceable addition to this informative and handy book.

AFRICA.

Black and White in South-East Africa: A Study in Sociology. By Maurice S. Evans, C.M.G. With a preface by Lieut.-Colonel Sir Matthew Nathan, G.C.M.G., late Governor of Natal. With a map. Second edition. London: Longmans, Green and Co., 1916. *Price* 7*s.* 6*d.*

This is a thoroughly well-informed and most interesting statement of the racial problem as it presents itself in its political and social aspects. The South-East Africa dealt with comprises the Transvaal, Natal, Basutoland, and Kaffraria. In addition to long and patient study of the many-sided problem and an earnest desire for the welfare of both the white and the coloured people, Mr. Evans possesses the special qualification of having been a member of the Natal Government's "Native Commission" of 1906-7. As a member of the Commission he travelled all over Natal and Zululand, and was enabled to form and shape his judgments after personal intercourse with many of the 301 European and 906 native witnesses who appeared before the Commission. Nevertheless, it must be confessed, the perusal of Mr. Evans' book does not give one the relief of a problem solved. Broadly put, Mr. Evans' solution is segregation and separate evolution of the black and white races, and where they must mingle, *i.e.* in the "white" territory, the whites shall be a patrician oligarchy, and the coloured people, virtually unfranchised plebeians. Spite of present difficulties and rocks ahead, this idea of separate compartments for sections of the population will be repudiated

by the great majority of experienced politicians, Christian men, and students of history, at all events as more than a temporary expedient. The native administration of portions of Basutoland is Mr. Evans' ideal of government for the reserved coloured territory and of opportunity for development upon native lines. A strictly limited number of elected representatives Mr. Evans would allow to the native population in the white territory. It is to the latter rather than to the former part of the constitution of his "republic" that critics will refuse approval. To set up a franchise based upon considerations of colour and race is a sowing of dragons' teeth.

The problem being worked out in South-East Africa, as Mr. Evans points out, is one "which will recur under different aspects whenever a strenuous European people, imbued with the desire to keep their race intact and pure, and intent on the utmost economic development, live alongside a conservative people at a lower stage of culture and yet withal virile and increasing in numbers." The German solution of the problem in German South-West Africa was the rifle; ordinary whites in South-East Africa live as if there were no problem; to them the coloured multitude by whom they are surrounded are only hands, cheap labour. Even South African statesmen, Mr. Evans complains, are so much occupied with the wheels of the machinery of Government that they rarely can take a large outlook on the social and political future.

In reply to Mr. Evans' opportunist expedient of communities politically separated, one might point out that, as he himself tells us later, the crux of the matter is the *actually existing* equality of franchise for white and black in the Cape; any day the coloured population there may wake up and elect a majority of the representatives in the Cape Parliament. The franchise once bestowed cannot be withdrawn, still less withdrawn from one class. But for "white territory" in the Cape and elsewhere, Lord Selborne's idea of impartial limitation seems a good one—a test of civilisation as a preliminary native qualification for the franchise, coupled, one would say, with heightened educational and property qualifications for white and black alike. Mr. Evans' book does not settle matters, but as a statement of the case it is indispensable to the student of South-East Africa.

The Northern Bantu: An Account of some Central African Tribes of the Uganda Protectorate. By JOHN ROSCOE, M.A., formerly of the Church Missionary Society. Cambridge: University Press, 1916. *Price* 12*s.* 6*d. net.*

This volume pertains to sociological and anthropological studies, and to the comparative study of religion rather than to geographical science, although direct geographical service is done by the defining of the areas of the seven peoples with whom the volume is concerned. The seven peoples occupy the territory to the north-east, north, and north-west of the Victoria Nyanza, and are described as important peoples, though less powerful than the Baganda themselves, of whose customs and beliefs Mr. Roscoe gave an account in his previous volume published in 1911. Five of the seven groups belong to the same race as the Baganda, viz., the Bantu Negro race, which, under various names, occupies the whole of the great African continent south of the Sudan until, in the extreme south-west, the territory of the Hottentots and Bushmen is reached.

The three sciences mentioned owe much to missionaries like Mr. Roscoe, who, knowing the native languages, have set themselves sympathetically to observe and record native customs and beliefs. In this volume the student will find a large amount of material systematically arranged regarding marriages, births, sickness, death, burial, religion, family relationships, and totems. Following the earlier

example and dicta of Sir J. G. Frazer, Mr. Roscoe confines himself strictly to the task of recording his observations. He is strictly a sociological and anthropological surveyor. He has no unifying hypothesis to propound, no illuminative contrast or identification with the usages in other lands to suggest. From beginning to end of the volume there is no attempt to generalise. Most valuable and needful the work of the trained observer is, but why should the generalisations and hypotheses of those with first-hand knowledge be deliberately repressed? On p. 120, for example, it is recorded how "marriage by capture" is still staged in one tribe in an actual tug of war between teams of clansmen of the bride and bridegroom respectively, the bride's leg being tied to the rope, so that perforce she must go with the winning team, which, of course, is always the bridegroom's. In the text, however, there is no suggestion that the play acted is "marriage by capture," although the familiar expression does occur in the index. Repeatedly also throughout the volume the student of animistic religions will look in vain for any acknowledgment that the observations recorded corroborate such fairly accepted generalisations regarding animism, as that in it we find a belief in great beings concerned with creation and origins, beneficent as a rule, but quiescent or far-removed, and neglected in worship, alongside of a host of minor, less-defined, actively maleficent, and carefully propitiated spirits or ghosts. It is surely noteworthy to find the animism of Central India, New Guinea, and Central South America paralleled in Uganda.

AMERICA.

In the Wake of the War Canoe. By the Venerable W. H. Collinson, Archdeacon of Metlakahtla. London: Seeley, Service and Co., 1915. *Price* 5*s. net.*

In the once little-known regions of the Pacific coast that skirt British Columbia, and among the Charlotte Islands, Mr. Collinson laboured for the long space of forty years. With quiet tact, simple courage, and heroic faith, he ventured himself among the savage Indian tribes of the district, and upon their treacherous seas. He dared the piratical head-hunting Haidas, carried his message to them, and lived it; and had the joy in time of witnessing the uprise of a nobler spirit that shook off the vile customs of an ancient past, and clothed them with many of the graces of true manhood. His narrative is an unpretentious relation of his intercourse with the various tribes, among whom suspicion, distrust, and enmity only too patently prevailed. He gives an insight into their mode of life, and of worship, and of their disposal of their dead. There was much that was positively repulsive in all three. But unwearied patience and kindness, and appeals to the innate greatness and goodness of man, gradually began to effect a change; and Mr. Collinson had the high distinction of seeing the rich fruits of the seed he had, along with others, so diligently and hopefully sown. It was well that he pioneered, for to-day the trader and the gold-seeker have passed into those regions, eager to exploit their wealth and produce, and indifferent to aught else. In time, the scientific investigator appeared in Professor Dawson, son of the more famous Sir William Dawson of Montreal, deputed by the Canadian Geological Survey Department. Accompanied by his brother, he made a survey of the islands, from which the first correct map was prepared. Others followed in their wake, and now the Grand Trunk Pacific Railway has brought coast and islands within the command of the ordinary traveller. Mr. Collinson has a thrilling story to tell, and it was well worth the telling. He is frank in his acknowledgment of the labours of other Christian workers. The book is supplied with an excellent index, a fairly good map, and numerous photographs.

AUSTRALASIA.

Rambles in Australia. By Edwin and Marion Sharpe Grew. London: Mills and Boon, 1916. *Price* 6*s.*

The authors of this book arrived in Australia in July 1914, apparently, though this is not directly stated, in the ship carrying the British Association party, and remained in the country till October. During this time they visited all the states and made also a journey to the Northern Territory. The book is illustrated by a fine series of photographs and a sketch-map. Its contents fall in fact, though not in arrangement, under two headings. On the one hand we have details and statistics derived from Government publications, and on the other fresh but quite unpretentious descriptions of the incidents of travel, the hospitality met with, and the impressions made by the scenes visited. No great effort is made to weld the two strains into an organic whole, and the reader passes with some sense of shock from a description of an excellent "high tea" to a historical summary of the settlement of Victoria, and from a pleasant little account of a bush picnic to statistics in regard to forestry. Probably many will adopt the method of judicious skipping, and confine themselves to the enjoyment of the pictures of Australian life, and the descriptions of the plants and animals of that strange continent.

The authors were apparently specially interested in the plants, and give some account of the more striking types. Some space is devoted to the prickly pear, which has become a great pest to farmers both in Queensland and New South Wales. The plant is spreading with great rapidity; to a much greater extent, it would appear, than it has done in southern Europe, partly, no doubt, because of the scantier population, and partly because of the different method of soil utilisation practised. Controversial questions throughout the book are treated with very great restraint, so that it is interesting to note the statement that "The Queensland sugar industry . . . has solved the problem of carrying on a tropical manufacture with white labour." The statement may be compared with that quoted here from an Australian source on page 289. The book will appeal especially to the prospective traveller, but the geographer will find some interesting descriptions of Australian life.

POLAR.

With Scott: The Silver Lining. By Griffith Taylor, D.Sc. Illustrations and Maps. London: Smith Elder, 1916. *Price* 10*s. net.*

This is the third book on the Scott expedition of 1910, and yet it is a welcome addition to Antarctic volumes, not because it tells us much that is new, but because it deals with the life and work of the Antarctic explorer in a way that is refreshingly novel. Mr. Griffith Taylor led two sledge journeys to the regions of the Koettlitz and Ferrar Glaciers and Granite harbour, in the summers of 1911 and 1912. The intervening winter he spent at the expedition's base at Cape Evans, and the greater part of the book deals with the life in the hut during these months of active waiting. Mr. Griffith Taylor has a style all his own, forcible, direct, slangy, and not invariably lucid. Whether he writes of trivial matters or things scientific it is the same, and his passion for ugly, though often expressive, scientific terms is on a par with his continual use of colloquialisms. The pages teem with varied information, relevant and irrelevant, and bristle with egoism, qualities which are characteristic of the Australian author. All this has resulted in a unique book: one sees the man behind it, eager, self-confident, sanguine and resourceful, the very man for Polar exploration. This volume is stamped with the

man throughout ; there is nothing colourless or anonymous in its pages. But Mr. Griffith Taylor has written too long a book by utilising in great degree his detailed diaries. He forgets that the trivial incidents, foolish perhaps, but treasured memories to the explorer himself, merely bore the general reader. The explorer's diaries should be regarded as studies for his work, but not the work itself. And surely the author's notes on various lectures delivered during the winter might well have been omitted, as well as some of the "cags," which is apparently his term for arguments. As the book stands it is disjointed, full of repetition and loaded with trivialities, but at the same time it contains excellent material and some graphic descriptions of the topography of South Victoria Land. Some of Mr. Taylor's little sketches, of which there are many, help even more than the excellent photographs to illustrate the book. There is no attempt to deal with journeys outside the author's personal experience, so that there is little overlapping with Scott's own book and that of Mr. Raymond Priestley describing the work of the northern party. It is the least exciting of the three books, for it is singularly devoid of sensational adventure, but it is none the less readable. Two mistakes might be pointed out : one in the title of the current meter figured on page 68, and the other the slip in describing the *Terra Nova* as a royal yacht. It may be of interest to note that the historic range-finder of the *Scotia* used in 1904 in the discovery of Coats Land went again to the Antarctic in the *Terra Nova*.

GENERAL.

Memorial Volume of the Transcontinental Excursion of 1912 of the American Geographical Society of New York. New York : Published by the Society, 1915.

The excursion of which this volume forms a memorial was organised by Professor William Morris Davis (now emeritus Professor of Harvard University), in order to celebrate, firstly, the sixtieth anniversary of the American Geographical Society, and, secondly, the entry in that year of that Society into its new building, a photograph of which forms the frontispiece.

The party consisted of a number of members from all the leading European countries who were present at the foundation of the American Geographical Society, besides a large number of Americans, some of whom accompanied the party throughout the excursion, while others joined it at various points and remained with it for longer or shorter distances.

A brief account of the development of the excursion is given by Professor Davis, and the history of the excursion is written at greater length by Professor Albert Perry Brigham, of Colgate University, Hamilton, New York. The rest of the volume is taken up with a number of papers in English, French, German, and Italian, contributed by various members of the excursion ; and it is worth noticing that, while a considerable number of these are in English, there is only one miserable little contribution of two pages by one of the British members of the party. The other English papers are all by continental writers, and in some cases the excellence and, indeed, elegance of the English is noteworthy. A map shows the route followed in the excursion, and from a statement on that map it appears that its total length, either by train, tramway car, boat, wagon, or automobile, was very nearly 13,000 miles, and it is not a little remarkable that, though the journey involved the crossing and re-crossing of America through two tiers of States, the party saw remarkably little of two of the most important resources of that vast country. It did not pass through the "Corn Belt," and though America is now by far the largest producer of coal in the world, the party was only once or twice within sight of a coal mine.

Among other illustrations of the volume there are portraits of most of the European members of the party, and one piece of tragic interest in connection with the excursion is that at least two of the members of the party have since fallen in the war: one a Hungarian, Count Teleki, and the other a bright young Frenchman, M. Pierre Bastian, of whom an interesting notice appeared in a recent number of the *Annales de Géographie* (No. 132, Nov. 1915), and of whom one regrets to find that no portrait is given.

A full index facilitates the consultation of the various papers, all except one of which deal with subjects connected with the United States, and more particularly those parts of the country which the members of the excursion visited.

Commerce and Industry. By J. Russell Smith. New York: Henry Holt and Company, 1916. *Price* 1 *dollar* 40 *cents.*

This work is largely a condensed version of the *Industrial and Commercial Geography* reviewed on p. 613, vol. xxx. of the *Magazine*, the condensation being accompanied by a good deal of transposition of matter to adapt it to new chapter headings. Most of the new matter is to be found in the two hundred pages bearing the general title "Foreign Countries" (that is, of course, the countries outside of the United States), and hence we may confine our remarks in the present notice to this section. It contains twenty-four chapters on separate countries or regions, which are treated less with respect to their geographical features than the complex of geographical conditions affecting their economic development. In many of these much insight is shown, the author with his accustomed independence of view constantly stimulating, but at the same time challenging, the thought of the reader, for this is not a book to be read without careful reflective consideration. The descriptions of China (p. 443) and Manchuria (p. 454) may be referred to as conspicuous examples of the author's success in such brief and summary treatment as his space allows of. The reader will also find much interest and instruction in the longest of all these chapters on regional geography, except that on the United Kingdom, the chapter entitled "The Old World Desert, and the Desert's Edge." We may note particularly in this chapter his remarks on the schooling of the nomad by his environment (pp. 430-1). The grouping of countries in some of the chapters is rather peculiar. Thus we have one on Holland and Denmark; but in this case, considering the author's point of view, we must recognise that he manages to justify his arrangement by his method of treatment. The combination of Roumania with Austria in the same chapter is not so successful.

In view of the many excellences of this text-book it is rather unfortunate that errors and statements apt to mislead should be so common. To speak of India as bearing "considerable likeness in size" to Europe (p. 461) is not happy. To say that the import of British cottons into India has declined (p. 467) is the very reverse of the truth. One cannot but wonder why the author emphasises the inferior supplies of coal in Japan (pp. 454, 455), and how he reconciles that with his pointing out (p. 547) of the importance of the Japanese coal supplies on the trans-Pacific routes from San Francisco. It is not the case that the oases east of Mesopotamia differ from those to the west in the absence of the date-palm (p. 433). That Winnipeg has a location like that of Chicago at the end of a lake (p. 307) is a statement that Mr. Smith would perhaps justify by pointing out how the lakes in that neighbourhood confine the routes connecting the east and the north-west of Canada to a narrow strip in which Winnipeg lies in a situation on which early conditions conferred special advantages, but those who are likely to use the book are not likely to put that meaning into it. The statement that "Liverpool saw

Bristol rise to the south of her" (p. 543) should be reversed; the fact that Bristol saw Liverpool rise to the north of her being a well-known historical fact easily explained by geographical combined with historical investigation. Another statement that needs, or, at any rate, would be improved by reversal, is that Austria's "iron-ore district is located in the populous and manufacturing state of Bohemia . . . and the coal in districts to the south-west of Vienna" (p. 393). It is rather the coal that is in central Bohemia, and the chief deposits of iron-ore to the south-west, though there is some ore also along with the coal. The short sentence on p. 395 stating that the Roumanian oilfield is the only one in Europe, except that in south-east Russia, manages to combine a good deal of error. It ignores, among others, the Galician and Hungarian oilfields, and it ought to read "those" in south-east Russia.

Scripture Atlas. London: George Philip and Son, 1915. *Price* 6*d. net.*

This extremely handy and cheap Scripture Atlas supplies a felt want. It comprises sixteen coloured plates containing fifty-two maps and plans. Based on the latest researches and embodying the two aspects—physical and climatic—of environment, the maps are worthy of the firm which produced them. The price is within the reach of every Bible student. On the covers there is a short but able description of the contents. We heartily recommend this atlas, which will be welcome also in its shilling and more durable edition.

Leaves from a Field Note-Book. By Professor J. H. Morgan. London: Macmillan and Co., Ltd., 1916. *Price* 5*s. net.*

As the Preface explains, "This book is an unofficial outcome of the writer's experiences during the five months he was attached to the General Headquarters' Staff as Home Office Commissioner with the British Expeditionary Force."

Practically every week some new work is hailed by an exuberant criticism as the "best" book of the War. We do not wish to confer on Professor Morgan's volume any such superfluous praise. We have read scores of books dealing with various aspects of life either at or behind the Front, and it is at least legitimate criticism to state that with one possible exception the work under review is the most illuminating, the most entertaining. It simply throbs with life, and the hand is the hand of a master who can touch pathos and humour with equal power, and that too in an inimitable style. Of sheer vigorous word-painting there are dozens of excellent specimens.

EDUCATIONAL.

A Regional Geography of the Six Continents. Book III. *North America.* By Ellis W. Heaton, B.Sc., F.G.S. London: Ralph, Holland and Co., 1916. *Price* 1*s.*

We have already noted the earlier issues of this series. The present number continues the excellent features of its predecessors. As before, climatic conditions are emphasised, and the regional treatment is carefully preserved. Dr. Haselhurst again supplies an Appendix of Questions and Exercises.

The New Science. By the Rev. Frank R. Burrows. London: George Philip and Son, 1916. *Price* 6*d. net.*

The new science is geography, and Mr. Burrows' little pamphlet is a stirring appeal for more geography and for better geography. The pamphlet is addressed to the general public, and the author by a series of examples indicates both the value of the subject to the ordinary man, and the modes by which it is now taught

by teachers with an adequate training and a sufficient equipment. He makes also various recommendations and suggestions as to ways in which public interest in geography might be increased.

Practical Geography Notebooks: Asia. By THOMAS FRANKLIN, A.C.P., A.R.S.G.S., and ERNEST R. SHEARMUR, B.Sc. Edinburgh and London: W. and A. K. Johnston, Ltd., 1915. *Price* 4*d. net.*

These Notebooks are based upon the Atlas Geographies (already reviewed in these columns), and present the usual features of their type. Questions and exercises on climate, vegetation, minerals, commerce, etc., are given, and blank maps and pages for graph are supplied. The questions on climate appear to us to be specially valuable.

Beginners' Regional Geography: The Americas. By J. B. REYNOLDS, B.A. London: A. and C. Black, 1915. *Price* 1*s.*

This is the first volume we have seen of the present series, a series intended for children from about seven to ten years of age. We gather that the main intention is to teach by means of a number of carefully selected pictures; the text merely serves as a sort of description of these pictures. Of course the teacher is supposed to supply more information than the text gives, and to lead the pupils to gather more from the pictures than the text suggests. It follows that the book is a guide and aid, and as such may justify its appearance. The intelligent teacher will require only the pictures, already supplied by Messrs. Black in a handier, more serviceable form.

BOOKS RECEIVED.

Beginners' Regional Geography: Africa and Australia. By J. B. REYNOLDS, B.A. Large Crown 8vo. Pp. 64. *Price* 1*s.* London: A. and C. Black, Ltd., 1916.

Rambles in Australia. By E. and M. S. GREW. Crown 8vo. Pp. xii + 292. *Price* 6*s.* London: Mills and Boon, Ltd., 1916.

The Voyages of the "Morning." By Captain GERALD S. DOORLY, R.N.R. Large post 8vo. Pp. xx + 224. *Price* 6*s. net.* London: Smith, Elder and Co., 1916.

Corso Pratico di Geografia Moderna per le Scuole Medie di 1° *Grado.* Par Dottore DINO MURATORE. Two Vols. Demy 8vo. Pp., Vol. I., viii + 296; Vol. II., xi + 336. *Prezzo L.* 1.80. Novara: Istituto Geografico de Agostini, 1916.

Germany before the War. By Baron BEYENS, late Belgian Minister at the Court of Berlin. Translated by PAUL V. COHN, B.A. Crown 8vo. Pp. 366. *Price* 3*s.* 6*d. net.* London: Thomas Nelson and Sons, 1916.

Commerce and Industry. By J. RUSSELL SMITH. Demy 8vo. Pp. viii + 596. *Price* 6*s.* New York: Henry Holt and Co., 1916.

La Syrie de demain. Par NADRA MOUTRAN. Un volume in-8°. Pp. viii + 462. *Prix* 6 *francs.* Paris, 1916.

Corso di Geografia per il Ginnasio Moderno. Volume primo: *l'Italia.* Par PAOLO REVELLI. Demy 8vo. Pp. viii + 263. *Prezzo L.* 1.50. Novara: Istituto Geografico de Agostini, 1916.

Board of Agriculture for Scotland: Agricultural Statistics, 1914. Glasgow, 1916.

The Official Year Book of New South Wales, 1914. Edited by JOHN B. TRIVETT. F.R.A.S., F.S.S. Sydney, 1915.

Spitsbergen Waters: Oceanographic Observations during the Cruise of the "Veslemöy" to Spitsbergen in 1912. By FRIDTJOF NANSEN. (Videnskapsselskapets Skrifter. I. Mat.-Naturo. Klasse 1915. No. 2.) Christiania, 1915.

Calendario Atlante de Agostini, anno XIII., 1916. Pp. 138. Novara, 1916.

Luigi Amadeo de Savoia, duca degli Abruzzi. Pp. 38. Novara, 1916.

Annual Report of the Secretary of the Interior, 1915. Washington, 1916.

Report on the Administration of the Madras Presidency, 1914-1915. Madras, 1915.

Commission of Conservation, Canada. Reports. Seven volumes. Toronto, 1916.

Review of the Trade of India in 1914-1915. London, 1916.

Deuxième Expédition Antarctique Française (1908-10), *commandée par le Dr. Jean Charcot. Documents Scientifiques.* Three Parts. Paris, 1915.

Diplomatic and Consular Reports.—Pernambuco (5565); Faroe Islands and Iceland (5566).

Colonial Reports (Annual).—British Guiana (874); Nigeria (878); Cayman Islands (Jamaica 879); St. Lucia (880); East Africa Protectorate (881); Report, by the Director, on the Work of the Imperial Institute (882); Nyasaland (883).

Publishers forwarding books for review will greatly oblige by marking the price *in clear figures, especially in the case of foreign books.*

NEW MAPS AND ATLASES.

EUROPE.

ORDNANCE SURVEY OF SCOTLAND.—The following publications were issued from 1st October to 31st December 1915 :—

Six-inch and larger Scale Maps. Six-inch Maps (revised).—Quarter-sheets, with contours in red. Price 1s. each. *Edinburghshire.*—(1B SE. and 1 SW.); 2 NE.; 7 SW.; 8 SW. *Renfrewshire.*—1 NW. and 1 NE.; 7 NW., SE.; 17 SE.; 18 NW., NE.

1 : 2500 Scale Maps (revised), with houses stippled and with areas. Price 3s. each. *Dumbartonshire* (Det.).—Sheet XXXIV. 1. *Fifeshire.*—Sheets XXV. 14, 15; XXVI. 13, 15; XXXIII. 2, 8, 10, 11, 12, 16; XXXIV. 1, 2, 3, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16; XXXVIII. 1, 4, 16; XXXIX. 1, 2, 3, 4, 5, 13, 14, 15; XLIII. 2. *Kinross-shire.*—Sheets XVIII. 13; XXV. 4, 6, 9, 11, 12, 14, 15; XXVI. 1, 2, 5, 9, 10, 13, 14, 15; XXXIII. 2; XXXIV. 1, 2, 3. *Linlithgowshire.*—Sheets (I. 16 and II. 13); III. 2, 6, 8; IV. 5, 6; V. 1, 6, 7, 10, 11; VII. 3, 4, 12; VIII. 1, 6, 8, 9; X. 1, 7, 8; XI. 13; XIII. 4, 8. Sheets V. 15; VIII. 12, 14, 15; IX. 1; XII. 2. Price 1s. 6d. each. *Stirlingshire.*—Sheets XI. 3, 4, 7, 8; XIa. 16; XVIII. 10, 14, 15; XXIV. 1. 2, 4, 5, 6, 7, 8, 10, 13; XXXI. 2, 6, 14. Sheets XI. 6; XII. (9 and 13); XVIII. 1. Price 1s. 6d. each.

Note.—There are no coloured editions of these Sheets, and the unrevised impressions have been withdrawn from sale.

Special enlargements from 1 : 2500 to 1 : 1250 scale. Prepared for the Land Valuation Department, Inland Revenue. Price 3s. each. Revised Editions. *Fifeshire.*—Sheets XXXIV. 11 S.E.; 12 S.W.

BARTHOLOMEW'S HALF-INCH TO MILE MAP OF SCOTLAND.—Sheet 1, Wigtown and Stranraer District. Orographical colouring and Roads. New edition, 1916. Price 1s. 6d. net, or 2s. on cloth.

John Bartholomew and Co., Edinburgh.

BARTHOLOMEW'S QUARTER-INCH TO MILE MAP OF IRELAND.—Sheet 2, Belfast and North-Eastern Counties. Orographical colouring and Roads. New edition, 1916. Price 1s. 6d. net, or 2s. on cloth.

John Bartholomew and Co., Edinburgh.

ITALIA, ATLANTE DELLA NOSTRA GUERRA.—16 tavole doppie a colori e numerose illustrazioni nel testo. 1916. Prezzo L. 10.

Istituto Geografico de Agostini, Novara.

This atlas deserves special mention as a piece of cartography which reflects great credit on the Agostini Institute. In addition to large-scale topographical maps of the Austro-Italian frontier regions, there are ethnographical and political maps, also interesting descriptive text with illustrations.

EUROPEAN WAR MAPS.

Western Theatre of War.—Scale 1 : 1,000,000, or 15·7 miles to an inch. Price 1s. net.

Geographical Section, General Staff, London.

Stanford's Half-inch Map of the British Front in France and Flanders.—Scale 1 : 126,720. 1916. Price 3s. net.

Edward Stanford, Ltd., London.

This map is on a scale large enough to show all roads, small villages and farmhouses.

Theatre of War in the Balkan Peninsula.—Scale 1 : 1,140,000 or 18 miles to an inch. Orographical and political colouring. 1916. Price 5s. net.

Edward Stanford, Ltd., London.

Teatro della Guerra Europea.—Scala di 1 : 4,000,000. Prezzo L. 1.

Carta della Dalmazia.—Scala di 1 : 500,000. Con note esplicative. 1916. Prezzo L. 2.

La Futura Balcania secondo le pretese degli Imperi Centrali.—Scala di 1 : 3,000,000. Con note esplicative. Prezzo L. 0.70.

Istituto Geografico de Agostini, Novara.

INTERNATIONAL MAP, Scale 1 : 1,000,000.—The following new sheets have been compiled at the Royal Geographical Society under the direction of the Geographical Section, General Staff. They are drawn and printed at the Ordnance Survey Office. 1916. Price 1s. net each sheet.

Bucuresti,	Provisional Edition,	North		L-35.
Jikomir,	„	„	„	M-35.
Minsk,	..	..	..	N-35.
Riga,	„	„	„	O-35.
Lyon,	..	..	..	L-31.
Stockholm,	„	„	„	O-34.

Geographical Section, General Staff, London.

ASIA.

ASIATIC WAR MAPS.

Bacon's War Map of Mesopotamia, including all Turkey in Asia. Scale 55 miles to an inch. Price 6d. net, 1s. on cloth.

G. W. Bacon and Co., Ltd., London.

Bartholomew's War Map of Asia Minor, Arabia, Persia, etc. Scale 1 : 4,000,000. Orographical colouring. Price 2s. 6d. mounted on cloth.

John Bartholomew and Co., Edinburgh.

Johnston's War Map of the Middle East, illustrating the campaigns in Persia, Mesopotamia, and the Caucasus. Scale 63 miles to an inch. Price 6d. net.

W. and A. K. Johnston, Ltd., London and Edinburgh.

INTERNATIONAL MAP, Scale 1 : 1,000,000.—Compiled at the Royal Geographical Society under the direction of Geographical Section of the General Staff. 1916. Price 2s. net each sheet.

Batum,	Provisional Issue,	North		K-37.
Erzerum,	,,	,,	,,	J-37.
Izmir (Smyrna)	,,	,,	,,	J-35.
Konia,	,,	,,	,,	J-36.
Sinob,	,,	,,		K-36.

Geographical Section, General Staff, London.

AFRICA.

EGYPT.—Topographical Map. Scale 1 : 250 or about 4 miles to an inch. 1914. Sheets—NW. Delta, 1-E; NE. Delta, 1-F; SW. Delta, 2-E; S.E. Delta, 2-F; Fayum, 3-E; El Saf, 3-F; Baharia Oasis, 4-D (Provisional); El Minia, 4-E.

Survey Department, Cairo.

RAILWAY MAP OF CENTRAL AND SOUTH AFRICA.—Revised to date 1916 and published by authority. *Offices of "South Africa," London.*

This useful map is more than up-to-date! "The authority" which publishes it is apparently impatient at the progress of events, and even German East Africa is already shown as "British (*late German*)."

AMERICA.

ATLAS OF CANADA.—Revised and enlarged edition, 1916. Prepared under the direction of J. E. Chalifour, Chief Geographer.

Department of the Interior, Ottawa.

The first edition of this valuable atlas was prepared under the direction of Mr. James White and published in 1906. We then commended its wide scope and research. The second edition, now issued under the direction of Mr. Chalifour, keeps pace with the great expansion of the Dominion in these ten years. The progress of exploration and surveys, the spread of railways and settlement, agriculture and commerce, are all strikingly displayed in the new atlas as compared with the 1906 edition. The maps of the first edition have been to a large extent re-drawn and several new ones are added. Altogether the atlas forms an impressive epitome of Canada and its resources, and reflects great credit on the Chief Geographer and his staff.

CANADA, STANDARD TOPOGRAPHICAL MAP.—Scale 1 : 500,000, or about 8 miles to an inch. J. E. Chalifour, Chief Geographer. 1916.

Nova Scotia, Halifax Sheet.

Nova Scotia and Quebec, Cape Breton Sheet.

Ontario, Kingston Sheet.

Ontario and Quebec, Pembroke Sheet.

Department of the Interior, Ottawa.

UNITED STATES SURVEY.—Topographic Sheets issued 1915-1916, on various scales. The figures after the name of each State indicate the number of sheets received. Price, with a few exceptions, 5 cents each sheet.

Scale 1 : 250,000, or about 4 miles to an inch. Map of Massachusetts and Rhode Island in one sheet.

Scale 1 : 125,000, or about 2 miles to an inch.—Arizona, 2; California, 2; Colorado, 2; Oklahoma, 1; S. Dakota, 1; Yosemite National Park, 1.

Scale 1 : 62,500, or about 1 mile to an inch.—Alaska, 1; Arizona, 1; California, 6; Colorado, 2; Delaware, 1; Florida, 1; Hawaii, 2; Illinois, 3; Kentucky, 1; Maine, 1; Minnesota, 2; Montana, 2; Nebraska, 2; New York, 1; Ohio, 9; Pennsylvania, 4; S. Dakota, 2; Utah, 1; Virginia, 2; West Virginia, 3; Washington, 1; Wyoming, 2.

Scale 1 : 31,680, or about 2 inches to a mile.—California, 13.

Scale 1 : 24,000, or about 2½ inches to a mile.—Nevada, 1.

Scale 1 : 12,000.—California, Kern River Oilfield, 2 sheets.

United States Geological Survey, Washington, D.C.

NORTH AMERICA, 1 : 1,000,000 INTERNATIONAL MAP. Point Conception Sheet. California, North I-10.

United States Geological Survey, Washington, D.C.

GENERAL.

THE TIMES WAR ATLAS AND GAZETTEER.—Forty coloured Maps of the War Areas. With Statistics relating to the Belligerent Countries and Index of over 13,000 places in Fighting Areas. Price 2s. 6d. net.

The Times Publishing Co., London.

A useful series of reference maps in handy form, clear and legible if somewhat crude in execution.

CALENDARIO ATLANTE DE AGOSTINI, 1916.—Anno XIII, Serie II, Vol. iii.

Istituto Geografico de Agostini, Novara.

The special feature of this interesting little Calendar for 1916 is a biographical sketch of the Italian geographer Giovanni Marinelli, with his portrait as a frontispiece.

FOREST REGIONS OF THE WORLD.—With the Geographical Distribution of Timber Trees. Mercator's Projection. Prepared by J. Hudson Davies, F.R.H.S. Size 30 × 40 inches. Price 6s. net, on cloth, rollers, varnished.

W. and A. K. Johnston, Ltd., London and Edinburgh.

The colouring of this map shows clearly the Forest Areas, the arid zones and the prairie and grass land. The names of the principal timber trees are shown in bold type on the districts in which they grow.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE RIGHT HON. EARL KITCHENER OF KHARTUM, K.G.

1850-1916

The tragic death, on June 5, of Lord Kitchener, while absent from this country on war service, deprives the Society of its Livingstone Gold Medallist for the current session, the medal having been presented to Lord Kitchener by His Grace the Duke of Buccleuch and Queensberry, President of the Society, at the War Office, London, at the beginning of the present year. As announced here in vol. xxxi. p. 428, the Livingstone Medal was awarded to Lord Kitchener by the Council of the Royal Scottish Geographical Society in recognition of his topographical work in connection with the survey of Palestine, and as director of the survey of Cyprus, as well as in recognition of his signal services to the State.

Of those services this is not the place to speak; but it is fitting that the Society should place on record here both its profound sense of the national loss, and its deep appreciation of a herculean task, all but completed when death came.

RECENT EXPLORATIONS IN THE JAPANESE ALPS.[1]

By Rev. WALTER WESTON, M.A., F.R.G.S.

(With Illustrations.)

"THE Japanese Alps" is the title I ventured to annex twenty years ago for the great mountain mass which stretches across the mainland of Japan at its widest span, lying approximately between 35°-37° N. and 137°-139° E. Its central portion is practically on the same latitude as the Sierra Nevada, in Southern Spain. Tokyo, the capital of Japan, from close to which some of the southern peaks are visible, is on almost the same latitude as Gibraltar.

Into the geological features of the main range I need not now enter. But in passing I may again remind you that it is mainly an immense backbone of granite, through which at various times mighty volcanic upheavals have thrust themselves; it is partly to this combination, together with the peculiar and marked climatic conditions of Central Japan, that we owe the varied peaks that rise from deep-cut romantic valleys, with their magnificent forest-clad flanks and wild, torrent-dinned ravines, the chief charms of the Japanese Alpine world.

The principal mountain expeditions on which I will now ask you to accompany me, I will take in geographical order, beginning with the most northerly: Ō Renge—"The Great Lotus Peak," about 120 miles north-west of Tokyo, and thirty miles south of Itoigawa, on the Sea of Japan, where the main granite axis of the range rises in bold tree-topped cliffs abruptly from the shore known as *Oya Shirazu*. Strictly speaking, Ō Renge is the name given to the cluster of summits (supposed to resemble the petals of a lotus flower) as seen by the people of the province of Etchu on the north; while the inhabitants of the great province of Shinshu on the south know the highest peak itself as Shirouma-dake or Hakuba San. Both these names mean "The White Horse Peak," though the one is the Japanese and the other the Chinese reading of the same characters. A good many years ago I explored the mountain by the northern route, only knowing it then as Ō Renge. I well remember the kind and unremitting attentions of a friendly little policeman, whom I met on my way from the coast; he forthwith took me in charge and never left me, night or day, for the whole week of the expedition.

From the highest point of Ō Renge, which I climbed from the north, my policeman friend and I looked down a steep rock-face falling sheer to a wild ravine filled with slopes of dazzling snow. Later on I learned it was possible to reach this ravine from the east, and it was to this task that Mrs. Weston and I applied ourselves at the end of our summer holiday in 1913. Our natural starting-point was Karuizawa, a popular

[1] Based upon an address delivered before the Society in Edinburgh on March 23. The paper, which is here somewhat abbreviated, is published in full in the *Journal* of the Royal Geographical Society, and we are indebted to that Society for permission to republish it and the accompanying illustrations.

"hill station" near the foot of the famous volcano of Asama-yama, on the railway that runs from Tokyo across Japan to Naoetsu on the Japan Sea.

Near the station of Komoro, on the right bank of the Chikumagawa, the Buddhist temple of Shakusonji juts out from the face of a great cliff (like the *musharabiyeh*, the carved bow window, of some Egyptian palace): at its foot a lovely lotus pond was blooming in all its glory of pink and white. The train pierces and worms its way through and over a mountain barrier for six hours westwards, to the wide long plain of Matsumoto, and we were finally set down at the wayside station of Akashina. Here a signpost on the platform tells us that this is the most convenient way of approach to the eastern outskirts of the northern Japanese Alps now rising before us. A handsome new inn now offers excellent accommodation, and the garden in early summer is a charming spot. From Akashina a native country 'bus, known as a *basha*, plies along the length of the plain northwards for a dozen miles to the finely placed little town of Ōmachi, between low hills on the right and the dark snow-seamed folds of the outliers of the main chain on the left.

This *basha* is a vehicle deserving of passing notice. It is a sort of cross between a hearse and an ambulance wagon, and the emotions it inspires, on a typical Japanese country road, are quite appropriate to either. Its speed, under favourable conditions, averages three to four miles per hour, and its employment, in those circumstances, always proved one of the fond delusions to which one at times so unaccountably clings. I must confess that a *basha* usually needs a good deal of clinging to, for an average day's outing in its creaking and gyrating frame offers one of the most strenuous forms of exercise in which a person of robust frame and unimpaired nerves is, if unmarried, justified in indulging. In some districts the *basha*, however, is now being driven off the road by "European style" landaus and victorias, themselves superseded in Tokyo streets by automobiles.

Near Ōmachi, one of the big boys' schools was holding the function known as "Commencement exercises," so called apparently because they always take place at the *end* of the summer term. The Japanese are not a bellicose people, though so intensely patriotic; but the Japanese boy is familiarised with the idea of universal military service from childhood, and he is taught that his greatest glory consists not so much in fighting for his country, as in *dying* for it. For it is death in battle that will bring prestige, not to his own name merely, but, what is much more, to that of his family, and it is still the *family*, and not the individual, that is the unit of social life at the present day. Nevertheless, the increase of railway and steamship communications, of emigration, etc., by scattering the individual members, is slowly loosening the old family ties. The subject is a fascinating one, and the facts are bound to have far-reaching effects in the future.

Near the town of Ōmachi the upland plain widens for a while, and here horse and man are baited at a good inn, the Taisan-kwan (literally "Grand Hotel des Alpe"). A tall post at the main entrance tells us that this is "the chief climbing centre for the Japanese Alps." Ōmachi

will probably one day become a Chamonix or a Grindelwald, and may then doubtless be fitly described somewhat as is another Japanese mountain town, of which I once saw an ingenuous railway advertisement declaring that "the principal occupation of its inhabitants is to feed peacefully upon tourists!"

Down the broad streets of Ōmachi run sparkling streams; the broad low house-roofs, with paper windows in the chimneys, like many in these Alpine regions, have their shingling weighted with boulders from the neighbouring river-bed. Beyond them, westwards, the snowy peaks of the Ō Renge or Shirouma range rise boldly. Over these the Harinoki-tōge, the finest pass in Japan, and the only one for fifty miles, leads across towards the city of Toyama, near the Sea of Japan.

As the hills draw closer on either hand the plain contracts and the road climbs up, passes two lovely lakes, Kizaki and Aoki, and at length reaches Yotsuya, a small village surrounded by mulberry plantations in a broad plain traversed by the waters of the Matsukawa. It was the silkworm season, and during the whole night long the landlord and his family were kept busy feeding the *O ko sama* ("the honourable little gentleman," as the precious worm is entitled). The noise of the nibbling myriads, on their bamboo trays, arranged in tiers in every available space outside our room, was exactly the noise of the scratching of pens in a university examination room. The only interruption to their operations that night was the louder but momentary uproar caused by an alarm of thieves, and the crashing of doors and windows as a burglar made his escape after a futile attempt to appropriate some of our baggage left in a ground-floor room.

Our actual start for Shirouma was delayed by the late arrival of our coolies. They had been busy celebrating, with *saké* and song, the festival of the *Ni-hyaku-tōka*, "the 210th day." This is regarded as the most critical of the whole year for the rice harvest, and the gods are then supplicated for good weather. It is a sort of Japanese St. Swithin's Day, and, if fine, is expected to betoken a favourable season for the forthcoming harvest.

The route to Shirouma leads due west, crossing the wide swift current of the Matsukawa, and mounting along the right bank of the main stream through a dense forest-clad valley, till we reach the tongue of the great snow ravine by which the final ridge of Shirouma is attained. This was the ravine on which years before I had looked down from the top of Ō Renge. On the left bank of the snow-slope we found the little shelter under a wedge of rock which is now used by the hunters of the district. This bivouac lies 5000 feet above the sea, and from it the following day we made the ascent, leaving a coolie behind to guard our provisions against possible bears and other roaming beasts in search of food. Each of our men carried a primitive kind of ice-axe and a pair of the native *crampons* known as *kana-kanjiki*.

The actual ascent, including halts, took about five hours. We rose the first 2500 feet of altitude up the snowy ravine, whose surface is here and there seamed by crevasses, sometimes lateral, but usually transverse. Near the head of the ravine, on the left, rises the triangu-

lar top of Shakushi-dake, and on the rocky slopes above the snow bloom

A snow ravine on the east of Shirouma-dake.

Alpine flowers of every hue and kind. It is probably the richest spot in the whole of Japan for the variety and abundance of its Alpine flora.

The rocks of the ravine itself are supposed to show traces of glacial action, but in my two ascents of the mountain I saw very little to justify the attempts that were made some years ago to give proofs of such a phenomenon. Above the flowery slopes we mounted to a saddle on the main arête and gained the top of Shirouma northwards, over broken rocks thinly carpeted here and there with low-growing *gōyō no matsu*, a kind of creeping pine. The height of the peak is nearly 9700 feet, and the prospect it commands is one of the most extensive in the whole of the Empire. For this reason it enjoys, with Hodaka, of which I shall presently speak, the distinction of the formal title of *Ittō* or "first-class" bellevue.

Our next expedition of importance was the exploration of a fine mountain lying thirty miles due south of Shirouma, which rejoices in the title of Otenjō-dake, "The peak of highest heaven." Our natural starting-point was once more Akashina, in the Matsumoto plain, which we traversed for eight miles westwards in jinrikisha and on foot to the mouth of the Nakabusa valley, which, as yet, no foreign traveller had ever penetrated.

At the hamlet of Miyashiro stood a Shinto shrine dedicated to the god Hodaka-yama. This divinity is said to reign over wind and storm, and in times of drought is approached with propitiatory rites known as *amagoi*, "intercessions for rain." Fires are lighted and guns discharged to compel her attention and induce her to quench the desecrating flames with the needed showers. The only available accommodation was at the house of the chief priest. Though he had never before seen a foreign visitor he received us kindly and gave us a charming room overlooking a pretty garden. Half hidden in the azalea bushes and irises, the waters of a noisy cascade fell into a little pool with ceaseless roar. A chance remark on this, as offering a somewhat violent lullaby, produced unexpected results. During the midnight hours the noise suddenly ceased, and we awoke to see dark forms moving to and fro across the garden. Our host had turned out of bed to divert the water into a remoter channel to ensure our repose!

Our actual starting-point for Otenjō was the *onsen* of Nakabusa, which lies, as do the majority of these Japanese Alpine hot springs, at an altitude of 5000 feet. The situation of some of them is most picturesque. This one is approached by a valley of surpassing and romantic beauty. A well-made track, here and there supported on struts of timber on the side of granite crags, winds in and out through dense vegetation, with the flashing green waters of the torrent of the Yu-gawa often 500 feet sheer below us. Above tower the extraordinarily steep cliffs of Otenjō on the right bank, or of Ariake-San on the left, 5000 to 7000 feet.

On a second visit to this "enchanted valley" we found that as a result of our praises of its beauty, the worthy landlord of the *onsen* had been inspired to put up signboards at suitable spots for the benefit of future prospective European visitors, to draw attention to the views, *e.g.*, "*Byōbu magari*. From here it is five miles to Nakabusa; far and away up in the sky can be seen the peaks of the Japanese Alps."

Nakabusa itself stands at the end of the valley in a *cul-de-sac* about twenty miles from Akashina, and almost completely shut in by dark

Yarigatake from the east. [illegible]

wooded heights. Except by the way we have come no exit is possible but over precipitous ridges 7000 or 9000 feet in height. During our stay we explored all the principal peaks that rise above Nakabusa, but on the details of these, though wholly new to foreign travel, I have not now time to dwell.

The waters of the *onsen* abound in sulphur and carbonic acid gas and leave the source at a temperature of 200° Fahr. The water is wholesome both for internal and external use.

Excellent quarters had been hurried to completion in honour of our visit, and the good proprietor also pointed out with pride one special spring of whose radio-activity a Government analyst had assured him, arousing hopes of unbounded usefulness and wealth.

The accommodation for the public is varied. We ourselves were given an excellent room, and during our stay a special bath was set aside for our use with the open-work lattice carefully papered to keep out prying eyes. The precaution was not unneeded. In the public baths the customs were different. The division of string or bamboo often stretched across the bath tanks, as a concession to foreign feelings in the larger towns, with the legend, "This side for ladies, that for gentlemen," was not here to be found. The only annoyance we suffered was afforded by certain specimens of the student class—whose rowdiness made night hideous to all within earshot, and whose rudeness to a foreign lady in such surroundings is sometimes one of the most unpleasant incidents of travel off the beaten tracks.

From Nakabusa with our mountain coolies we climbed for four hours up precipitous forest-clad slopes to the crest of the granite ridge at 9000 feet, that runs parallel to and on the east of the main chain of which the sharp arrowhead of Yarigatake is the culminating point. As far as the eye could reach stretched a confused sea of mountain ridges, from 8000 to nearly 10,500 feet, wave after wave, with densely tree-clothed flanks. Their crests here and there rose bare and gaunt excepting where the low branches of the creeping pine spread a thick cushion, often thick and close enough to walk over without great difficulty. The slope is barer and more gentle on the west; that on the east is extraordinarily steep.

The ascent of Ōtenjō involved a series of ups and downs along the ridge for over four hours, and the final peak rose abruptly from a wild and shattered gap from which a great landslide had fallen at no distant date. The highest point is of granitic gneiss, nearly 9700 feet, and we bivouacked for the night in a hole burrowed out on the south arête about 1000 feet below the actual crest.

From here we made a descent to Kamikōchi, a splendid expedition of about ten hours. The prospect as we started at dawn revealed on the west the magnificent ramparts of the Yarigatake-Hodaka ridge running north and south, while beyond the shoulder of the pyramid of Jōnen-dake, one of my earliest climbs, the graceful cone of Fuji suddenly appeared nearly one hundred miles away: on the north the Sea of Japan lay shimmering in the sunlight fifty miles distant.

The descent leads southward along the ridge and then abruptly drops down its western flank by slippery watercourses and the broken granite boulders of the torrent beds. In the Ninomata, one of the two main sources of the Adzusagawa, a great landslide scars the red granite cliffs and has dammed the green waters into a lovely emerald lake whose still surface mirrors every single bush and tree with crystal

clearness. High up, on the left, as we climbed over and among the mighty boulders of the torrent bed or forced our way through the dense vegetation, the dark sides of Chō-ga-dake rose forbiddingly. On this "Butterfly peak" some time ago our hunter coolies found the body of an outlaw whose native villagers had expelled him from their midst for his persistently wicked deeds. In some of those far-off hamlets some form of mutual discipline is often needed to enforce order for the common good; and, as in this case, it was usual for incorrigible evil-doers when their crimes became unbearable to be presented with their birth certificate, to see their names erased from the village roll, and themselves driven from the commune never to return.

The Ninomata joins the main stream of the Adzusagawa some four or five miles south-east of the foot of Yarigatake, and our crossing of Ōtenjō was successfully accomplished as we followed its great bend round the broad base of Hodaka, past the foot of the Tokugo-tōge, finally pulling up at the familiar *onsen* of Kamikōchi, now the most famous and frequented of all the resting-places of those travellers who come to pay in yearly growing numbers their homage at the shrine of the divinities of Yarigatake, Hodaka-yama, or their attendant satellites.

Kamikōchi lies near the foot of the great granite ramparts and spires of Hodaka-yama, 5000 feet above the sea. During the course of many visits since first I traversed the region twenty years ago its fascination has grown, and with Mrs. Weston or alone I have explored all the peaks and valleys for which it is the natural starting-point. Of these expeditions I have chosen as the most deserving of your notice the ascent of the highest of the Hodaka group, which I first made, alone, in the summer of 1912, in storm, and repeated in sunshine in the following year, with Mrs. Weston as my companion.

Our leader, on nearly every occasion, was the famous old bear-hunter, Kamonji Kamijo, with whom I have made most of my climbs in this romantic region. Kamonji is a remarkable character, and though at times his aspect is that of a good-natured and intelligent gorilla, his behaviour is always that of a man; those who have ever heard his weird laughter and observed his simian agility, even at sixty-three, upon a mountain-side, will never forget his quaint personality. He occupies a little hut at the base of Hodaka, where in summer he fishes for trout in the dark meres hard by, or matures his plans for stalking the bear and chamois that engage his winter activities.

Our start was an early one, for the ascent is long and strenuous. A clear crescent moon with upturned horns was sailing across the gateway of the hills, purple shadows filled the valley, and grey mists rose from the bed of the Adzusagawa, while above the tops of the tall pines white bands of cloud hung motionless. Heavy dew fell in showers from every leaf as we pushed through the rank vegetation, and we were soon so soaked that the fording of the streams on our way to the foot of the mountain failed to make us wetter.

At a height of 6500 feet we found quantities of luscious black currants growing wild in the forest, and as we emerged from this our course lay for some distance up the Shirasawa, a ravine filled with

broken boulders hurled down in confusion from the surrounding cliffs. The ascent of this river of rock was tedious enough until we found we were not making it alone—for, only 300 yards ahead, we suddenly espied the unwieldy form of a magnificent black bear lurching along towards the cliffs on our right. Above the rocks came a long slope of hummocky wind-blown snow, with here and there a *moulin* in full work; and this at length ended in a huge bergschrund fully 50 feet deep at the foot of the rock-face up which our further way must lie. The climbing was of a high order of interest and exceedingly strenuous, till at length we reached the upper part of the granite wall from which the summit rises. Here it eased off a little, and the top, 10,200 feet, was reached without further difficulty.

The main mass of Hodaka is a gigantic horseshoe of granite cliffs, and it is the central point that forms its apex. Even up to the very top Alpine flowers abound—soldanellas, white anemones, gentians of various kinds, and the invariable *Potentilla gelida*, whose cheerful little yellow bloom I have now found on the actual summit of nearly every one of the highest peaks of the Japanese Alps. The climb had cost us seven hours of hard work and resolute perseverance, and Kamonji's delight at conducting his *Okusama*, his "honourable mistress," thither was as pleasing as it was sincere. It was the first time a lady climber had gained any such distinction in the Japanese Alps, and what legends may not hereafter be woven around the achievement it is impossible to predict.

The most striking feature of the wide prospect from the top is undoubtedly the serpentine windings of the great wall that connects the granite battlements and towers of Hodaka with the mass of igneous rocks that suddenly throw up the sharp arrowhead of Yarigatake—10,130 feet. On either hand rugged flanks fall down steeply to densely wooded torrent ravines, the home only of the bears and chamois, wolves and boars, in which the region abounds. The sole object that marked any movement was the delicate column of pearl-grey smoke that rose in the still air from the active crater of Yakedake, about 8500 feet, the highest active volcano in Japan. Its outbursts are connected with those of Asamayama, fifty miles to the north-east. Since our visit on June 6, 1915, a violent eruption of Yakedake has occurred, accompanied by the opening of four new craters on the eastern slope of the mountain. From one of these poured a mingled torrent of mud and rocks, which dammed up the waters of the Adzusagawa, forming a lake 1½ miles long, which has rendered impassable the picturesque route to Shimajima *via* the hot springs of Shirahone, described below.

The reluctant escape from Kamikōchi to the outer world may best be made either by traversing the pass of Tokugo and down the ravine of a tributary torrent of the Adzusagawa (the river on whose bank the *onsen* stands), or by following the wooded slopes that in the main rise high above its right bank. The latter is the longer and more arduous route, but it is the more picturesque. Close by Kamikōchi it passes the Tashiro-ko, a secluded mere, whose waters mirror the surrounding cliffs in their still, untroubled surface. Some hours further on the *onsen* of Shirahone lies in a secluded hollow at the foot of the massive, double-

topped, extinct volcano of Norikura. It has been in the possession of the Saito family, its present owners, for over three hundred years. A good road is gradually approaching it from the east, and it is along this that the way lies to Matsumoto, one of the chief towns in the province of Shinshu, famous for its silk trade. A magnificent defile, in many places reminding one of the valley of the Derbyshire Derwent at Matlock, but on a far grander scale, finally opens out towards the Matsumoto plain at the village of Shimajima. From here the railway station of Matsumoto may be gained in a *basha* ride of some thirteen miles.

THE SHACKLETON ANTARCTIC EXPEDITION.

THE long-awaited news of the *Endurance* arrived on May 31 in the shape of a telegram from Sir Ernest Shackleton, despatched from Port Stanley, Falkland Islands, and containing the information that he had arrived there after journeying from Elephant Island, *via* South Georgia, the *Endurance* having been crushed by the ice in the middle of the Weddell Sea at the end of October 1915.

The members of the expedition reached Elephant Island in the South Shetland group on April 16, 1916, and Sir Ernest left on April 24 with five men in a boat, leaving a party of twenty-two men in an ice hole in the cliffs in Elephant Island, in urgent need of rescue. On June 2 the *Daily Chronicle* published a full dispatch from Sir Ernest Shackleton, and from this we extract the following details. The account should be followed on the map showing the track of the *Scotia* which we published here in vol. xxi. opposite p. 36, and on the bathymetrical map of the South Atlantic and Weddell Sea which appears in the same volume, opposite p. 440.

The *Endurance* left South Georgia on December 6, 1914, and encountered heavy pack two days later off the Sandwich group. The pack was entered in 58° 40′ S. lat., long. 18° W., and the ship forced her way through icebergs for 1000 miles. On January 10, 1915, Coats Land was sighted, and the ice was found to become heavier. It was 50 feet thick, and the floes were often 150 square miles in extent. It was decided to land at the earliest opportunity, and send the *Endurance* back. A new land was discovered, presumably an extension of Coats Land in a southerly direction, and its coast was followed for 200 miles, great glaciers discharging into the sea being observed. The land was named Caird Coast, and may be regarded as marking the connection between Coats Land and Prince Leopold Land, discovered by the explorer Filchner in 1912. While coasting the new land a series of abnormal circumstances occurred. A great northward migration of seals was noticed, including thousands of animals, severe north-easterly gales were experienced, and abnormally low temperatures for the season were recorded, the temperature falling below zero in early February. Eventually the ship was beset in the ice, which never opened again. In the middle of the month there seemed to be signs of the ice opening, and, despite the shortage

of coal, an attempt was made to break out. But by the end of February there were forty-nine degrees of frost, and the old and young packs became cemented together. It was found impossible either to land or to extricate the ship, and preparations were made for wintering.

"The winter was generally speaking mild, with the usual blizzards. Sixty-seven degrees of frost was the lowest temperature we recorded. The *Endurance* drifted south-west, reaching a furthest south of 77° south latitude (longitude 35° west). We continued a zig-zag drift across the Weddell Sea to the north-west, immovably fixed in the pack. General scientific work was carried out meanwhile. In view of the possibility of pressure we placed our sledging stores on deck, and we trained the dogs for emergencies. Twenty dogs died from sickness. Some of the dogs disappeared on April 15 for 109 days.

"In mid-April we had a moment of grave anxiety. The pack drove the ship towards a great stranded berg, and we were saved only by a sudden change in the drift. In June began the menace of the ice pressure, the ice rafting up to a height of twenty feet close to the ship. In July the pressure became more intense, and there were ominous signs that the ship would be involved in the pressure. The ice rose into ridges of forty feet in height, grinding into the floes ahead. Blocks of thirty tons were thrown about, communicating shocks to the ship.

"Our preparations for the worst eventualities were completed on August 1, when, while examining the floes during a blizzard, the ice split under my feet, and I had just rushed the dogs on board when with a grinding crash the pressure took us. The *Endurance* hove bodily out of the ice and was flung before the gale against masses of up-driven ice. The vessel stood the strain, and by midday the pressure ceased. The ship heeled over half out of the water, and with her rudder split. Thenceforth the *Endurance* was a focus of active pressure. In September she was badly nipped, her sides bending and her beams buckling. Eventually she rose clear."

In the middle of October the ship broke from the floe, and a distant water sky gave hope of escape and safety. At this time the vessel was drifting over the site of the supposed land marked on the bathymetrical chart already referred to as sighted by Morrell, and regarded by him as identical with the New South Greenland of Johnson. Here soundings gave 1900 fathoms of water, which seems to prove that New South Greenland does not exist in the longitude marked on the map. The question of the form of the Weddell Sea in this region has been discussed by Dr. Bruce in the article already referred to (vol. xxi. p. 411), as well as in a paper read before a meeting of the Schweizerische Naturforschende Gesellschaft at Basel in 1910 (published by the Oceanographical Laboratory as a pamphlet). We hope to print here at a later date an article by Dr. Bruce on the subject in the light of the new observations made during the drift of the *Endurance*.

A period of renewed ice pressure followed the brief interval, the stern post was damaged, and the ship began to leak dangerously, so that the pumps had to be worked continuously. What followed may be described in Sir Ernest's own words:—

"On October 16, in the direct space of ten seconds, through heavy pressure, the *Endurance* was thrown out on to the ice on her beam ends, with temperatures below zero and the pumps freezing. On October 26 the floes commenced screwing, and caused the ship's side to open. We lowered the boats, sledges, and provisions on to the ice. On October 27 the end came. The terrific pressure culminated in tearing out the stern and rudder posts, the main deck breaking upwards. Icebergs pierced the ship; the water overmastered the pumps, extinguishing the fires. I ordered all hands on to the ice. The pressure continuing near the ship, we shifted the equipment."

At midnight a crack opened through the spot where the camp had been established on the ice, and the pressure continued. There was a cold wind, with 48° of frost. The following day the camp was moved, and a survey of the position showed that the conditions were serious. The party were in 69° 5′ S. lat., and 51° 32′ W. long., the nearest land being Paulet Island, 346 miles distant. The equipment was reorganised, all the scientific records and film photographs being saved. On October 30 a start was made northwards over the ice, the dogs drawing the sledges with provisions, and the men hauling the boats. As a system of relays was necessary, progress was only at the rate of one mile a day. The surface was very difficult owing to new cracks and high pressure ridges, and the open cracks contained killer whales. After consideration of the difficulties of a northward movement it was decided to camp in the vicinity of the wreck and the salved stores, and to depend upon the northerly drift and the summer break-up of the ice. On October 31 an Ocean Camp was established on a heavy floe, and more stores were salved from the wreck by cutting through the ice and the main deck. In this way 100 cases of food were obtained. The three boats, named after donors to the expedition, the *James Caird*, *Dudley Docker* and *Stancomb-Wills*, were prepared for a sea journey.

"For the next two months we drifted north. The *Endurance* sank on November 20. The November drift was only sixty miles to the good: the December drift was equally disappointing, northerly gales repeatedly driving us back after good progress. On December 23 we left Ocean Camp, as the ice appeared close enough to travel over. Hauling the boats, marching night and day through deep snow, and cutting through pressure ridges, the whole party with two boats advanced nine miles in five days. On December 28 rotten ice made it impossible to proceed, the boats sinking through the brash. At times the various units were isolated on separate floes. We were forced to retreat and set up 'Patience Camp.' There we passed January, February, and March 1916, slowly drifting north. The floe-ice grew small under the attack of neighbouring icebergs and gales, and was finally reduced to 100 yards square. In January we shot five of our dog teams owing to the shortage of food. The party were put on stringent rations because of the dearth of seals and the limited hunting radius.

"In January 1916 we crossed the Antarctic Circle. February passed without any hope of escape. By the middle of March the winter commenced, with low temperatures, long nights, and heavy blizzards.

The tents were worn out. There was a shortage of fuel, and the possibility of making Paulet Island disappeared. We were drifting north rapidly, and a northerly swell indicated that open water was close. On March 23 we sighted the distant peaks of Joinville Island (the northern extremity of West Antarcticus), but an impenetrable belt of ice, working under pressure, precluded any attempt of crossing to the land. On April 7 we sighted Clarence Island (the most easterly of the South Shetlands). Here the party had a narrow escape. A great berg, driving through the pack, missed us by only 200 yards. On April 8 the floe on which our camp was pitched split to pieces under the influence of the swell. As the ice opened we launched the boats. The tide-rip, driving the ice, almost finished our expedition. Rowing through masses of pack, we made northward, and pulled the boats up on a floe for the night.

"A heavy swell set in at midnight, and a floe split under the tent. We pulled one man out of the water before the floes closed together. The whole party waited for daylight on a rocking floe only 100 feet long. On the 10th we made westward in a heavy snow squall, and reached open sea, but there we met a high swell, which forced us to retreat to the pack ice. The sea was too heavy for our deeply-laden open boats, so during the night I drastically reduced the equipment, and we camped on a floe-berg. The temperature was low, and the sea was increasing. The berg began to split during the night. Dawn showed that the berg was undermined, and an icefoot developed. It was surrounded by surging pack-ice, undulating to a heavy swell. At noon on the 11th our opportunity came. The ice opened suddenly, and we flung the boats into the sea over the icefoot of reeling berg.

"We proceeded westward all night, as there was no place to camp, and rowed throughout the 12th, continuing west. The position gave anxiety, for observations showed that, despite our efforts to make westward since the 9th, the current had drifted us to the east. That night no camping-place was found, and we fastened the boats to the lee side of a floe-berg in a heavy swell. The wind, suddenly shifting, drove the boats against the berg, but we cut the painters and escaped to the open sea. The sea surface was freezing, and the temperature stood below zero. Several of the party were suffering from exposure.

"On the 13th we decided to run north for Elephant Island, for it was hopeless to make for Deception Island. We passed through open pack ice where it was difficult to manœuvre the boats. One of them, the *James Caird*, was holed above the water-line. The wind increasing to a gale, we were driven out of the pack and ran till night, and then hove to in a high sea. The boats were weighted down by ice from the freezing spray. The crew of the *Stancombe-Wills* were suffering greatly, having no water, and it being impossible to warm food.

"On April 14 we sighted Elephant Island forty miles away. A strong wind heading us, we made little progress. The gale increased and the *James Caird* took the *Stancombe-Wills* in tow. Hudson and Blackbore were severely frost-bitten. All night a high cross-sea and a furious gale raged, with driving snow, and there was a low temperature at midnight. The *Dudley Docker* disappeared.

"In the morning of the 15th we reached the north end of the island. There were inaccessible cliffs, but it was decided to attempt to land on a small beach in view of the condition of the party, which had now been without water or hot food for two days. All the equipment was sodden. On landing we found that several members of the party were on the verge of physical and mental collapse. An inspection of the beach showed that it was impossible to remain, as it was covered at high spring tides. On the 16th I sent Wild to search the coast for a safer landing. On the 17th we proceeded westward, but were nearly blown to sea, owing to strong winds and the weakness of a large number of the party. We landed again through a heavy surf. We found that the beach would be untenable in heavy gales, but proceeded to cut a hole in the ice slope above reach of the waves."

The position of the party here was serious, owing to the shortage of food and the inadequate protection against winter, and Sir Ernest decided to make an attempt to reach the whaling station in South Georgia, 750 miles distant, to obtain help, the main party being left under the charge of Mr. Frank Wild. The weather was appallingly bad, with constant blizzards, but the longest boat, the *James Caird*, 22 feet long, was covered in by the ship's carpenter with sledge runners, box lids, and canvas. On April 24 a start was made with five volunteers, and after passing through the stream ice, the boat ran north with a fair wind during the first night. Thereafter constant gales and snowstorms were experienced, and during the fortnight which the journey lasted the sun was only seen for observation purposes three times. On the sixth day it was found necessary to throw over some of the equipment, owing to the boat being heavily iced; everything within it was soaked. It was necessary to bale constantly, and to scrape ice out of the boat, and off its sides and rudder.

"On the eighth day, while hove to in a gale, we lost our sea anchor, the rope being cut by the ice. On the fourteenth day we sighted the cliffs and the west coast of South Georgia during a clearance in the snowstorm, and we stood in for the land, but, observing seas spouting on uncharted reefs, we hauled off for the night. On May 9 the wind again increased to a hurricane, and enormous seas were running on a dead lee shore.

"We saw nothing till the afternoon, when between squalls we found we were drifting on to the cliffs. One chance remained. We set a reefed sail. The boat stood the strain, and was kept afloat by continuous baling. The wind shifted at the very crisis, enabling us to clear the land. On the 10th, the gale restarting, I decided, in view of the condition of the party and the shortage of water, to beach the boat and try to cross the island to the whaling station on the east coast. At dusk we managed to beach the boat in a small cove. We were too weak to haul her up, so we hung on to her all night. On the 11th we cut away her topsides, which enabled us to haul her up. On the 12th the bay filled with ice, but on the 15th we launched the boat and reached the head of King Haakon Bay. On May 19 I started across the island.

"As Vincent and M'Nish were unfit to march, I took Crean and Worsley with me. As the interior of the island was quite unknown, I

took three days' provisions and a cooking stove, but no other equipment. Thirty-six hours' continuous marching covered thirty miles, over glaciers, across mountain ridges, and snowfields from 2000 feet to 4000 feet above sea-level. We made good progress, assisted by the moonlight. We reached Stromness whaling station in the afternoon of May 20. This is the first time that the island of South Georgia has been crossed. I received every assistance from the manager of the whaling station, Mr. Sorilee, who despatched a whaler the same night to bring round the remainder of the party."

Sir Ernest Shackleton does not directly state that the three men, including Macarthy as well as M'Nish and Vincent, were brought safely round, but we may presume that this was the case, and that an extraordinarily bold journey in an open boat was thus accomplished without loss. Further, as the twenty-two men left at Elephant Island, together with the six forming the South Georgian party, account for the original twenty-eight members of the Weddell Sea party (cf. vol. xxx. p. 492), it would appear that no lives were lost with the wrecking of the *Dudley Docker*.

At the Norwegian whaling station the urgent need of proceeding to the help of the Elephant Island party was at once perceived, and a whaler was got ready at once, being ready for sea on the morning of May 23. Several attempts were made to break through to the south in this whaler, but all proved failures, and eventually the vessel was obliged to make for the Falklands, which, as already stated, were reached on May 31.

The foregoing account shows that the weather conditions made it impossible to carry out the original programme of the expedition, but it is stated that a considerable amount of scientific work was carried on during the drift, while the perilous journey on the ice-floes of the stormy Weddell Sea will rank high among the tales of Polar exploration. The history of the expedition seems to confirm the view that this sea is, in most seasons, a highly unfavourable and dangerous line of approach to the Antarctic Continent.

The necessity for sending prompt relief to the party marooned on Elephant Island, with very inadequate supplies, was appreciated immediately after the receipt of Sir Ernest Shackleton's telegram, and on June 8 the Uruguayan government sent off from Monte Video the iron steamer *Instituto Pesca* to Elephant Island. The ship went *via* the Falkland Islands to pick up Sir Ernest Shackleton, reaching Port Stanley about a week after leaving Monte Video. An officer of the British auxiliary cruiser *Macedonia* was on board the *Instituto Pesca*, and the cruiser was to maintain wireless communication with it. The fact that the *Instituto Pesca* is an iron ship makes it less suitable for ice work than a wooden vessel would be, but it is hoped that the boat may achieve its purpose.

It is also announced that the Australian Commonwealth Government, the New Zealand Government and the Imperial Government, are to share the expense of a relief expedition to the Ross Sea to rescue the ten men left there. The *Aurora* is to be re-fitted to serve as relief ship, and will set out towards the end of the year.

ARABIA AND THE ARABS.

By V. DINGELSTEDT, Corr. Member of the R.S.G.S.

Introductory.—Confined in their great peninsula, subjected to the influence of their peculiar climate and geographical situation, the Arabs remain outside our occidental world, so profoundly troubled: almost undisturbed they continue the life they have been accustomed to since prehistoric times. Yet outside Arabia the Arabs have accomplished great things in the past, and may yet accomplish them again in the future.

In the Middle Ages the Arabs were the bearers of an advanced and original civilisation; they exercised considerable influence on the minds and social state of Western Europe, and contributed mightily to the progress of agriculture, industry, commerce, science, and art. They introduced the use of the compass and of paper, they induced a Europe sunk into stagnation to enter on the path of independent thought and research; they have given philosophers, mathematicians, and astronomers to mankind: they have made known to civilisation the contributions of the Greeks, the Persians, the Assyrians, and the other Orientals, and they have contributed in addition original thought. They have also become eminent as religious teachers, as great conquerors and as navigators. But the Arabs need to go abroad to manifest their latent energies: so long as they are confined in their great peninsula, they have almost no history. Strictly conservative, they continue, even in our days, the life of their ancestors of many thousand years ago.

Arabs belong to a white race, but since they have no objection to intermarriage with negroes, they serve as intermediaries between the two races. The writer has no particular authority to speak on Arabs and their country, neither does he pretend to be able to say anything new: but, having studied his subject with the aid of the best authorities, he hopes that his succinct account will not be devoid of interest.

Though Arabia is as yet very imperfectly known, the number of enterprising travellers who have explored it may be counted already at above two hundred. Arabia is a vast land of a very varied physical aspect, inhabited by richly endowed tribes. Its deserts, giving the means of livelihood to the freedom-loving Bedouins with their patient camels and swift horses, are not so frightful as many people imagine. The law of adaptation to a given environment has operated here with great effect. A Bedouin in the desert, under his tent, is certainly as happy in his own way as a dandy amid his luxurious surroundings. The importance of the geographical study of such a country as Arabia is increased by the fact that here the influence of the natural environment upon the life of man and beasts is very marked. The high political importance of Arabia has also to be considered: it is in Mesopotamia and the Persian Gulf that the centre of international rivalry in Asia will be fixed. In the present paper we are concerned only with the Arab at home.

Physical Features.—Arabia, or Arabistân, Jezirat-el-Arab, has an area very much larger than that of the British provinces in India. It is nearly twelve times as large as Austria, and six times as large as the German Empire: viz. some 1,230,000 square miles, of which total the Turkish provinces account for 173,700 square miles. With the exception of the north, Arabia is surrounded on all sides by sea. Its coastline has an extension of over four thousand miles. This coastline is unfortunately the least attractive part of the vast country, as it considerably hinders access to its more attractive interior. The frowning exterior hides some delicious lands of marvellous fertility, enjoying at once all the advantages of hot and of temperate climates (Niebuhr). Arabia is in its greater part almost rainless, and has no rivers which reach the sea-coast; numerous wadys however exist, almost dry channels in summer, but full to the brim in winter. In some provinces there are abundant underground watercourses. The most important of the wadys is Wady-el-Ruma, running from Hejaz in a north-eastern direction towards the Euphrates for nearly 800 miles. The longest wadys in Oman are Halfain and Beni Rowaiha, which flow in opposite directions. The second forms the largest and the most important valley in the land and lies between two mountain ranges: it has a length of about 100 miles, and is studded with numerous towns and hamlets. In the wadys is collected all the animal life of the country. Besides wadys there are many wells, which make the existence of a large nomadic population possible, and are also the most frequent causes of quarrels.

There are extensive volcanic tracts, the so-called *Harrats*. One of the largest of them, Khaibar, north of Medina, has an area of about 2500 square miles. Over nearly seven degrees of latitude, from Tebuk to Mecca, is stretched a volcanic upland, forming in some places a succession of deep troughs (niggeras) full of blown sand; in others a labyrinth of lava crags and plains of lava sand. It reaches its greatest height, 6000 feet, in the Harrat of Khaibar, which marks the division of waters between the Wady-el-Ruma and the Wady-el-Humth. Parallel to the upland to the eastward is the sandstone chain of Jebel Helman and Jebel Irnân, with its outliers of Jebel Birrd and Jebel-el-Karram, and beyond that stretches the desert of whiter sand, whose edge shows all along the brown sandstone desert.

In southern Oman extends the mountain chain Jebel Akhdar (Green Mountain), crossed and described by Colonel Miles in 1876. Its precipitous front rises abruptly to an altitude of nearly 10,000 feet, and forms a most impressive sight. Further from the coast in the same region are other mountain chains, such as Okdat.

The particular characteristic of Arabia is a vast expanse of sandy deserts, but they are not wholly unfriendly to man, for their air is healthy, and they give food to a nomadic population with their camels and horses.

Arabia contains about 670,000 square miles of cultivated, or at least cultivatable land. According to Palgrave, "The general type of Arabia is that of a central table-land, surrounded by a desert ring, sandy to the south, west, and east, stony to the north. This outlying circle is

in its turn girt by a line of mountains, low and sterile for the most part, but attaining in Yemen and Oman considerable height, breadth, and fertility, while beyond these a narrow rim of coast is bordered by the sea. The surface of the innermost tableland equals somewhat less than one-half of the entire peninsula: and its special limits are much affected and often absolutely fixed by the windings and inrunnings of the Nefud" (sandy desert).

Climate.—The diversity of surface produces diversity of climate, which is generally hot and dry. In summer the average maximum temperature is 102° F., the minimum 85°. The maximum in some cases attains 131° F. Northern Arabia has a winter season, with cold rains and occasional frosts. Jebel Tobeyk, in the north-west, is covered with snow all winter. The chains of hills limit the influence of the currents of sea air; during the hot season the simoon blows. In the mountains of Oman and Yemen, as well as in all the interior plateau of Nejd, a healthful, bracing climate prevails.[1] According to Palgrave, the climate of the whole Nejd is perhaps one of the healthiest in the world. The climate of Bahrein, in the Persian Gulf, is not unhealthy at all seasons. In spring and autumn the weather is delightful (temperature 60-85° F.).

Natural Products.—Arabia may well possess considerable mineral riches, but being little accessible to European enterprise, these remain mostly unexplored. There are to be found iron, copper, lead, coal, basalt, asphaltum, and precious stones such as emerald, carnelian, agate, and onyx. There are in the north rich salt springs, in Oman and in Irak mineralised waters. In the Persian Gulf pearls are found.

Arabia was the El-Dorado of the ancient Egyptians, the chief source of the world's wealth in spices, precious woods, and the most coveted vegetable products, such as the pomegranate, the sycamore, the aloe, and perhaps also Lawsonia. The study of the flora of South Arabia throws some light on the origin and history of various cultivated species of immense importance in the maintenance of many people. In many sultry districts the date-palm grows alone. In South Arabia we find wheat, barley, millet, palms, tobacco, indigo, cotton, sugar, tamarinds, coffee, senna, and many aromatic and spice plants. Frankincense (Olibanum), the object of trade of the merchants of South Arabia to Egypt in the most primitive times, also grows. In the Jebel Tan, in Oman, *Indigo tinctoria* is largely cultivated in some villages.

The date-tree constitutes the wealth of many regions, where it is extremely prolific. In the Dayara or circle of Semail, in Oman, there are especially fine kinds, called "Fard." In Oman vegetation is fairly abundant—tamarisks, oleanders, euphorbias, acacias are common.

In many parts of Northern Arabia fruits and vegetables are plentiful—apricot, plum, quince, citron, lemon, apple, vines, figs, tomatoes, cucumber, squash, beans, onions, all grow. The desert produces fragrant grass, admirably suited for the pasturage of splendid breeds of horses and camels. The fauna has an African character. Besides

[1] See Mr. Zwemer, *Arabia*, p. 178.

camels and horses there are sheep, goats, oxen as domestic animals, gazelles and ostriches in the oases of the deserts, where the lion, panther, hyena, and jackal hunt their prey. The fertile districts are often devastated by flights of locusts. Monkeys, pheasants, and doves, as also oryx and ibex, are found. On the coast fish and turtle abound.

The breed of Arabian horses has been cultivated for several thousand years; but the most characteristic of animals is the camel, a true Arabian animal. The breed of Oman is celebrated for its beauty and swiftness.

Camels can travel without water for twelve or thirteen days. Arab horses can go without water for twenty-four hours. Sheep and goats can live also almost without drinking water. Horses and camels constitute the wealth of Arabs. No Arab family can exist without at least one camel, but to be in easy circumstances it is necessary to have some thirty or forty, and to be considered rich—sixty.

In some parts of Eastern Arabia edible lizards, called dabb (*Uromastix acanthinurus*) exist. In the deserts antelopes, bustards, cheetahs, hares, are met with, while sandrails honeycomb the ground. There are also chats, larks, ravens, scrub-warblers. Horned vipers of a bright sandy colour also occur.

Inhabitants.—The numerous striking features of the great Arabian peninsula, the diversities of its topography and climate, have produced during the ages a peculiar and highly gifted people called to play a great part in the destinies of humanity. It is a world very different from our occidental one, and its peculiarities have been powerfully developed by the quasi-insular situation of the land and the enforced endogeny.

Arabs have excellent physical development and great mental gifts, but we are able to appreciate the first better than the last, in consequence of the great difference between our mentality and theirs. There have been few investigations on the anthropology of the Arabs. The works of Deniker and Broca deal with the Arabs of Northern Africa, who, according to Bertholon and Chantre, are only arabianised Berbers.

Gruflida-Ruggeri[1] has measured some Arabian skulls found in the necropolis of Abbasieh, near Cairo; they were mostly brachycephalic, with a mean cephalic index of 84·46. According to some other writers, the cephalic index of the Arabs varies from 82·56 to 73·18. In the *Globe*, published by the Geographical Society of Geneva,[2] were published the results of E. Pittard's researches upon certain Arabs from the Dobrudja; they were mostly dolichocephalic with a mean index of 77·16.

There are certainly great diversities in the somatological aspect of Arabs, the more so, since in the veins of many of them there runs some negro blood. They may be leptoprosope and leptorhinian; they have usually large eyes with dark iris. Their ears are mostly big, the mouth large, with thick and fleshy lips. It is asserted that there are Arabs who have flat noses, and woolly, strongly pigmented hair. According to Nazarof, a Russian, there are in the Egyptian Sudan Arabic tribes, such as the Jaalin, which have upright foreheads, sharp noses, and pointed

[1] *Atti della S. Romana di Anthropologia*, 1910.

[2] *Mémoires*, 1913.

chins, as on the island of Meroe, or sloping foreheads, rather aquiline noses, and slightly retreating chins, such as the Shagiah.

The Baggara tribes of Kordofan are remarkable for their fine physique and handsome features; they are great hunters and warriors. The finest Arab population is to be found in Damascus, where the people are the descendants of the original invaders, who came upon the first wave of conquest, and have kept their stock almost pure.

The Arab is of medium stature, and very muscular—the cheek-bones are prominent, the eyebrows long and bushy, the eye deep-set, fiery black or a very dark brown. A typical Arab of Yemen has manly, beautiful features, a long and straight nose, rather thick lips, elongated face, abundant hair, and very large expressive eyes under bushy eyebrows.

The Aenezes, the most powerful Bedouin tribe, are seldom above 5 feet 2 or 3 inches in height; their features are regular, their noses are often aquiline, their persons well formed; their beard is short and thin, the black hair abundant and thick, and their deep-set dark eyes sparkle from under their bushy black eyebrows with a fire unknown in our climes (Burckhardt). The female Bedouins seem taller in proportion than the men; their features in general are handsome, the deportment graceful. The complexion is very tawny. In the Pamirs are found black Arabs (Saracens).

The Arabs are divided into a great number of tribes and clans, varying greatly in number. From the point of view of character, customs, and manners there are to be distinguished settled tribes, city dwellers, agriculturists, semi-nomads, and pure nomads. There is thus a twofold civilisation.

The individual variety of characters among Arabs is, perhaps, greater than among any other nation, for nowhere else exists a greater individual liberty, the Arab often not recognising any other law save that dictated by his free will and custom. The common trait of character of all Arabs seems to be, as with Jews, an inordinate love of money. The settled tribes are styled Hadesi and Fellahs; they are despised by the Bedouin nomads, who, physically and morally, are their superiors.

The nomadic Arab has a lofty and proud expression; he is quick-witted, imaginative, and fond of poetry. Courage, temperance, hospitality are his main virtues; he is also revengeful and rapacious. He has peculiar notions of the rights of property, but he has also his traditional code of law and honour. He acknowledges the law of blood revenge, but for all that he is most careful not to spill blood without the gravest provocation.

The Bedouins, inhabiting the vast deserts of Arabia, are highly interesting people, whose customs and manners were described by J. L. Burckhardt some eighty-five years ago,[1] and later by D. Carruthers.[2] They are nomads, and live in tents divided in two parts for men and women. In summer they roam continually, remaining in the same place only for a few days. Their endurance is astonishing; they sleep bare-

[1] *Notes on the Bedouins and Wahabis.* London, 1831.
[2] *G. J.*, vol. xxxv. p. 3.

footed in an open tent, upon the burning sand, wrapt only in a mantle (kombar). They are perfectly adapted to the geographical conditions of their environment, and do not progress. In order to change the Bedouin must leave his country.

There are few people in the world that are as free as the Bedouins; individual independence with them borders upon anarchy. Every tribe and every camp has its sheikh, but these chiefs exercise their authority mainly by personal moral prestige. The real government consists in the strength of the families, organised in armed bodies, ready to punish aggression or to retaliate. A Bedouin bows only to persuasion, and he says that he acknowledges no master but Allah. The sheikh, in counsel with the chief men of his tribe, declares war, leads the tribe, conducts negotiations, fixes the spot for encampments, entertains strangers, and does all from his personal resources.

In their manners and customs Bedouins show some analogy to the Kurds, for both are pastoral nomads, excellent horsemen, and good shots. Gibbon said of them: "As the naked wilderness could not maintain a people of hunters, they rose at once to the more secure and plentiful condition of the pastoral life, the same life uniformly pursued by the roving tribes of the desert; and in the portrait of the modern Bedoweens we may trace the features of their ancestors, who in the age of Moses or Mahomet dwelt under similar tents, and conducted their horses and camels and sheep to the same springs and the same pastures."

Besides sheikhs Bedouins have also judges (Kadys) who proceed according to ancient customs. The not inconsiderable fees are paid by the winning party. In a complicated case the *Kadu* sends the suitors to *mdessha*, who subjects them to ordeal. The only punishments known to Bedouins are pecuniary fines.

To provide for the security of his family the Arab applies to one of his friends to become protector (Wasy) to his children. For this service he offers a camel. The situation of women in Arabia was considerably lowered with the advent of Mahommed, in consequence of the introduction of the veil. The Arab considers a woman as an inferior being. He obliges her to work for his comfort; he protects her, and treats her with consideration, though not with much justice. The fights between rival tribes of Bedouins are usually carried outside the camp, and never at night; the women are respected, and never taken prisoners. The Arab is usually a monogamist. Marriage is quickly concluded as soon as the father of the girl, after consulting her wishes, has given a favourable reply to a friend of the suitor despatched to arrange the business. All that is needed is the sacrifice of a sheep. Easily concluded, the marriage is also easily broken. Dissatisfied with his wife, or simply desirous of a change, an Arab has only to say to her *eut talek*—"thou art divorced." He offers her a she-camel as a parting gift. The man may remarry as soon as he pleases; but his repudiated wife has to wait at least forty days before she may remarry. An unhappy wife may escape from her husband's tent and fly to that of her kindred. The abandoned husband may try to induce his discontented wife to return home, and if he does not succeed he may refuse to pronounce the sacra-

mental words *cut talak*, and thus condemn her to widowhood. There are no old maids among Bedouins, but many divorced young women not allowed to remarry. At maturity a young man receives from his father a mare or a camel, and is then left free to try his fortune where best he can.

The Bedouin is sober and temperate. He indulges in luxuries only on rare occasions, as at a festival, or on the arrival of a stranger. The greatest family festival is that of the circumcision (moszana), which takes place at six or seven years of age. On this occasion the men assemble in the tent for the feast, whilst the women gather around to sing. After the operation, the men leave the tent, take their lances, mount their mares, arrange themselves on both sides of the tent in two lines, and begin their usual horseback riding and encounters with lances.

Other feasts are Ramadan, and one in the honour of the sacrifice upon the Mount Ararat. Other festivities take place only on the arrival of a stranger, for hospitality is one of the Arab's virtues. A guest is regarded as sacred, and it is an insult to a Bedouin to reproach him with neglect of hospitality.

The Arabs have not much respect for property, and they do not attach to robbery and theft our notions of criminality. An Arab robber considers his profession as honourable as any other, and the term *lucking* for a young man is flattering. They rob without scruple, and delight in bringing away by stealth what they cannot obtain by courage. Bedouins have reduced robbery to as regular a system as any other handicraft: they proceed by rules, much as do the Kurds or the Gypsies. Between Arab tribes feuds are frequent, but their little wars are as child's play in comparison with ours. Their wars are bloodless, the enemy is attacked usually by surprise, and the weaker party easily gives way in hope of being able to retaliate later. These fights for plunder are short, and peace is easily made. In regard to respect of the person the Bedouins seem to be superior to us. They never inflict corporal punishment, nor do they imprison any one. They love money, and there are few who would abstain from cheating and robbing in order to acquire wealth, but for crimes fines are the only punishment.

The Bedouin displays his manly character when he defends his guest and submits to the reverses of fortune. He is capable of pity and gratitude. He is free, jocose, and decent in his family intercourse, and in the assemblies of his comrades. The nomadic Arabs show more wit and sagacity than the townspeople. "Their heads are clear," says Burckhardt, "their spirit unimpaired, their mind not corrupt: there are few nations among whom natural talents are so diffused." In order to judge the Arab from the psychological point of view we must take into consideration, apart from his religious influence, his rich language—a valuable gift of Nature denoting the natural gifts of people having created and using it. "It is a language largely extended over the face of the earth, and which has had, perhaps, more to do with the destiny of mankind than any other, except English."[1]

Arabic and English have for ages contended for world-wide extension.

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[1] Rev. Geo. E. Post, M.D., Beirut (Zwemer, p. 238).

At present about one hundred and fifty millions of people speak Arabic, or at least know its literature in the Koran, and use it in their prayers. The Arab tongue has been thus characterised by a missionary in Syria as follows: "A pure and original speech of the greatest flexibility, with an enormous vocabulary, with great grammatical possibilities, fitted to convey theological and philosophical and scientific thought in a manner not to be excelled by any language except English."[1]

According to Ernest Renan, Arabic surpasses all its sister Semitic languages in its rich vocabulary, delicacy of expression, and the logic of its grammatical construction. This language appeared at the beginning in its present perfect form, it did not have to submit to any important modification. The Mussulmen believe that only prayers pronounced in correct Arabic pronunciation are granted a hearing by Allah. There are to-day over one hundred Arabic newspapers and magazines regularly published and enjoying an immense circulation in all parts of the Arabic-speaking world.

The Arabic language is distinguished by its beauty, but also by its difficulty. It has a logical structure, which surpasses that of any other language; its boundless vocabulary and wealth of synonyms are admirable. There are five hundred names given to the lion, and two hundred words for serpent; one thousand different terms for sword; a thousand words relating to the camel. Arabs have names for every physical feature in the landscape. But the language is very poor in some departments of thought, especially ethics.

Provinces of Arabia.

Arabia is divided into seven provinces—Yemen, Hejaz, Hadramaut, Oman, El Haza, Irak, and Nejd. The first two are situated on the eastern coast of the Red Sea. Hadramaut, on the Indian Ocean, stretches northward to the unknown region of the Dahna. Oman occupies a peninsula between the southern shore of the Persian Gulf and the ocean; El Haza is on the coast north of El-Katar peninsula. Irak is the northern river-country, corresponding to Turkish Arabia, whilst Nejd is the vast central region. One-fifth of this country belongs to Turkey; Aden, in Yemen, is a British settlement; the remainder is quasi-independent. The territories between the peninsula of Katar and the mountains of Oman remain unknown.

Yemen.—The most attractive and the best-known province is Yemen, the Switzerland of Arabia, according to the Rev. Mr. Zwemer; Arabia Felix of the ancients. It is well watered, has fertile valleys, planted with coffee and kaat, is traversed by some mountains, such as Jebel Sobr, over 7000 feet of altitude, the Sumara range, Suk-el-Khamis (9500 feet).

The coastal plain of Yemen is hot and barren, but at the base of the foothills there are fertile arable lands. Through the foothills run rivers in deep, well-wooded gorges, beyond which the land is open and park-

[1] Burckhardt, *Travels in Arabia*, 1830.

like, an agricultural country. Next comes the steep ascent to the table-land, which occupies the greater part of the peninsula. With the exception of the coast, "the abode of heat" (*Tehama*), the whole region is perfectly suitable for the residence of Europeans; the thermometer even in the hot summer seldom rises above 85° F. Its scourge is the ruinous and corrupt Turkish rule against which there is almost chronic rebellion. "If the Turks would clear out of Yemen," says John Keith Falconer, "a wonderful field for commerce would be thrown open."

Yemen has a population of about two and a half millions,[1] in an area of 77,250 square miles—five times greater than that of Switzerland.

There are considerable numbers of towns. Sana, ancient Uzal, the chief city of Yemen, 7648 feet above sea-level, lies in a wide, level valley between Jebel Negum and the neighbouring ranges. It contains 50,000 inhabitants, among whom are many Jews and Turks. Next to Baghdad it is the most flourishing city in Arabia. The manufacture of silk, jewellery, and arms is carried on here on a large scale, and there are to be found different kinds of European goods. It is the centre of trade for all northern Yemen and north-western Hadramaut.

Taiz is a large fortified village, the residence of the Mutesarrif; it has five large ruined mosques, and was once a centre of learning. It is the centre of kaat-culture for all the province. Kaat (*Celastrus* or *Catha edulis*) is a shrub or small tree, whose leaves and young twigs are masticated and produce wakefulness and even hallucination. Young and old Arabs, Jews, and Turks use it in great quantities. Taiz has about 5000 inhabitants, among whom are many Jews, as in Yemen in general.

Jerim is a large town of a miserable appearance situated in a hollow of the Sumara range among the most charming scenery; it has a fortress and some beautiful houses, but is subject to malaria. Damar is an equally large town, at 8000 feet altitude, with three mosques and a large bazaar; the three or four-storied stone houses are clean and well built.

On the southern coast of Yemen is situated the British port Aden, and owing to its possession British influence now embraces a district of two hundred miles long by forty broad, containing a population of about 140,000. The independent tribes on the coast from Aden to Muscat, and from this last city to Bahrein, on the Persian Gulf, are subsidised and protected by Great Britain.

Aden, with a population of about 30,000, has a motley character; besides Arabs, it contains many Jews, as well as Persians, Turks, Egyptians, Somalis, Hindus, Parsees, and even Chinese. It is a great centre for native shipping and an important commercial town. Over 300,000 camels enter Aden from the north every year. The total value of imports and exports averages over thirty million rupees.

Hodeida, by the sea, once important, has now a rather miserable appearance with its narrow and filthy streets. It is with Aden the main unattractive gateway to the populous and healthy country of Yemen. Its population is of a mixed character; in a separate quarter live Akhdam Arabs, who are considered as outcasts. Once flourishing, the trade of

[1] Zwemer, *Arabia*.

this city is now declining. Mocha, a seaport, once the capital of Yemen, is famous for its coffee; it exports also dates, gums, balm, ivory, and senna.

(*To be continued.*)

THE HUDSON BAY ROAD.[1]

It is more than three hundred years since Hudson Bay was discovered. During the last two hundred years its waters have been unostentatiously navigated by the vessels of the Hudson Bay Company: yet it is only within the past twenty years that its possibilities have been seriously examined. With an area of over 350,000 square miles it is the third largest sea in the world. Nearly the whole of it is farther south than the Gulf of Bothnia. Its southern end is in the same latitude as London. What then are the reasons for its Cinderella-like position? First, its shores are to all appearance bleak, and they are certainly very sparsely inhabited. Secondly, Hudson's Strait, its exit to the ocean, is in the extreme north, and leads into a sea infested with icebergs and ice-floes. Thirdly, it is only the opening-up in recent times of Central Canada which has given it a hinterland. Fourthly, it cannot be denied that some short sighted people in Eastern Canada have persistently frowned upon any proposals for a route from the west alternative to that which passes their own doors. Possibly, also, the two great transcontinental railway companies and the lake shipping companies have had something to say.

For several years the public of Manitoba have been advocating the construction of a railway from Central Canada to Hudson Bay, but the process of educating federal opinion has been slow and difficult. It was the general view that Hudson Bay was blocked by ice practically all the year round, and the resources of the country through which the proposed line was to run were considered to be very small. Thus a large amount of prejudice had to be fought against. Previous to 1912 Manitoba, with its 73,732 square miles of area, was rather scornfully looked upon as the "postage-stamp province." Early in that year, however, an Act was passed extending the area to 251,832 miles, and giving to Manitoba a length of coast on Hudson Bay. The first sod of the new railway had been cut in 1910, but very little more had been done. Now the Dominion Government promised renewed activity, and at the end of 1914 the line had been completed through a distance of 240 miles, leaving 170 miles still to be constructed.

The southern terminus of the railway is The Pas, a town to which Mr. de Trémaudan devotes two chapters under the title of the "Northern Metropolis." It is situated at the junction of the River Pas with the

[1] *The Hudson Bay Road* (1498-1915). By A. H. de Trémaudan, of the Manitoba Bar (Founder, and for two years Editor of the *Herald* at The Pas, Dec. 1911 to Dec. 1913). With 30 illustrations and 2 maps. London and Toronto: J. M. Dent and Sons, Limited, 1915. Price 7s. 6d. net.

Saskatchewan at the point where the main river suddenly contracts from a width of a mile to a little over 800 feet. In the book under review it is stated (p. 209) that "for a hundred miles or so, east and west, it is the only spot where the Saskatchewan River can be crossed at a relatively small expense or at all." What are the obstacles below The Pas is not clearly stated, but the map shows a lake, and the Cross and other rapids are mentioned in the text. Should the Hudson Bay Route prove a success, it is clear that The Pas will become an important centre, and the prophetic title quoted above will be justified. In 1913 the population was about 2000, of which 1453 were of Caucasian race.

The Hudson Bay terminus originally proposed was Fort Churchill, at the mouth of the Churchill River. In 1909, however, Mr. M. J. Butter, Deputy Minister of Railways and Chief Engineer, issued a report proving conclusively the superiority of Port Nelson at the mouth of the Nelson River. This superiority consists mainly in much greater facilities for navigation, and secondarily in a more southerly position. The distance from The Pas to Port Nelson is obviously shorter than that to Fort Churchill, on neither route are the construction difficulties serious, while suitable timber is available all along the River Nelson, but totally lacking on the last hundred miles to Fort Churchill.

The great advantage of the Hudson Bay Route over that by the Great Lakes is best seen from the following tabular statement abridged from the text (p. 211). Saskatoon is taken as the starting-point, presumably because it is the centre of a great wheat region.

ROUTE BY THE GREAT LAKES.

Saskatoon, Winnipeg, Port Arthur, Sault Ste. Marie, Sarnia, Montreal, Liverpool.

Land Miles.	Water Miles.	Total.
1489	3359	4848

HUDSON BAY ROUTE.

Saskatoon, The Pas, Port Nelson, Liverpool.

Land Miles.	Water Miles.	Total.
697	2966	3663

There is thus a difference in favour of the Hudson Bay Route of 1185 miles.

Should the Hudson Bay Route prove impracticable, the "boosters" of The Pas claim still another advantage. A railway has been proposed from Montreal to Port Nottoway at the head of James Bay. From Saskatoon to Montreal by the Great Lakes Route is a distance of 1960 miles; by The Pas, Port Nelson, Hudson Bay, and Port Nottoway is 1832 miles or 128 miles less. Further, it is claimed that the region between The Pas and Port Nelson will itself provide considerable traffic. The natural resources of this portion of Manitoba consist of fish, furs, timber, and minerals. Fish abound in the numerous lakes and rivers,

and in Hudson Bay. It is asserted, for example, that with facilities for export a salmon-canning industry might be begun which would rival that of British Columbia. The market exists already in the large cities of the central United States. As for furs it was here that the Hudson Bay Company had its foundation and its main source of supply. It must not be forgotten, however, that with the advent of increased population the fur-bearing animals become scarce. Along the whole length of the new railway is much timber. The trees are not large, but are sufficient for sleepers, and specially suited for pulp. The minerals of the country have not been exhaustively examined, but iron-stone, nickel, gold, silver, copper, plumbago, and others are known to exist. How far these or any of them are in paying quantities is not yet determined, but the indications are said in several cases to be promising. The abundance and excellent quality of limestone are undoubtedly proved.

Mr. de Trémaudan is very optimistic with regard to agricultural possibilities. In the chapter on Climate he gives the opinion of several authorities, one of whom states that the climate of New Manitoba is distinctly warmer than in the same latitude 400 miles to the west, where wheat is already grown. We think, however, that more definite information is required. It is clear that late frosts in spring, and early frosts in autumn form a considerable drawback. The summer temperature seems to correspond with that of the north of Scotland in June, and that of Edinburgh district in July and August. The longer summer days, doubtless, give an advantage over more southern regions in Canada, but their length of eighteen hours is no more than what we are accustomed to here. There are fairly large areas with fertile alluvial soil, but much of the country consists of muskeg or swamp. The peaty surface-covering would have to be removed, and adequate drainage introduced, and we know how slowly and at what cost such improvements have been carried out in older countries.

If one reasons from the arguments put forward on both sides, so far as we have been able to sum them up from this and other publications, one must come to the conclusion that the Hudson Bay Route will be a great success. The difference in mileage alone is convincing. But there is one consideration—and it seems to us a very obvious one—which appears to have been overlooked by both parties, and to which certainly no reference has been made by Mr. de Trémaudan. It is admitted that the principal traffic along the new route will consist of wheat and meat. If such commodities are to be conveyed cheaply the cargoes must be large. This means that the ships must be of reasonable size. Now while Hudson Bay does not freeze in winter except round the coast, and while it is true that no icebergs are discharged into it by glaciers, Hudson Strait is undoubtedly infested with floating ice even, or rather especially, in summer; and between the entrance to the Strait and the south of Greenland icebergs are a constant danger. It is universally recognised that small and so easily manœuvred craft are the safest in such seas. There is no need to elaborate this point. If our view is the right one it would seem at the very least that in the estimates of the cost of carriage

by the new route a very considerable allowance will have to be made for heavy insurance rates.

As far as the Hudson Bay railway is concerned there is every reason for believing that it will pay its way. Some one has said that railways create their own traffic, and this has been proved true in regions much less favoured than New Manitoba. A country, nearly the whole of which is farther south than Finland, and which abounds in many kinds of natural wealth, must in course of time become well populated, and the completion of the Hudson Bay line will inevitably cause an immediate increase in the number of settlers. T. S. Muir.

GEOGRAPHICAL NOTES.

Europe.

The Italian Earthquake of 1915.—Professor E. Oddone contributes to the *Bollettino* of the Italian Seismological Society (vol. xix.) an article on the Avezzano earthquake of January 13, 1915. Some details in regard to this have already been given here (see vol. xxxi. pp. 96 and 381), but it is interesting to note that the duration of the shock was one of the shortest known for a destructive earthquake, for it only lasted slightly over five seconds. A map of the epicentral area, which accompanies the paper, shows that there were two chief areas of destruction. Of these the more northerly lies in the basin formerly occupied by the drained Lake Fucino, and extends from the neighbourhood of Avezzano to that of Lecce. Here the intensity reached 12 on the Cancani duodecimal scale. The southern area lay in the Val Liri, and here the intensity was usually 10, but in places 11. The variations of intensity in the epicentral district are attributed mainly to orographical and geological conditions, and not to the existence of separate centres of disturbance. The centre of the epicentral area seems to have been in 41° 58′ N. lat. and 13° 56′ E. long., or about 16 kilometres (10 miles) to the south-east of Avezzano. The ground in this district is broken up by numerous fissures, the most remarkable being a perimetral crack, which has been traced almost uninterruptedly for 70 kilometres (about 44 miles), and is usually from 30 to 100 centimetres (about 12 to 40 inches) in width; the ground within the crack, that is towards the Fucino basin, being depressed relatively by 30 to 90 centimetres.

The Ochil Earthquakes.—At a meeting of the Royal Society of Edinburgh, held in March last, Dr. C. Davison gave an account of the earthquakes which occurred in the Ochil Hills region during the period 1900-14. The district chiefly affected lies to the south of the hills, and includes Dunblane, Bridge of Allan, Menstrie, Alva, Tillicoultry, and neighbouring places. The shocks began in 1900, but did not become frequent till 1905, when ten were recorded. Thereafter the numbers were as follows:—1906, 19; 1907, 13; 1908, 17; 1909, 18; 1910, 19; 1911, 8; 1912, 74; 1913, 2; 1914, 1. The total number of

shocks during the period considered was 186. Of these those which occurred on September 2, 1905, October 20, 1908, and May 13, 1912, were unusually strong, and were felt over areas of nearly one thousand miles. The last of the three was so strong that a slight increase in intensity would have led to damage to property. The earthquakes seem to have been due to small movements along the great fault which skirts the southern slope of the Ochils. There were indications both of an annual and of a semi-annual periodicity.

America.

The Climate and Vegetation of California.—Professor D. H. Campbell contributes to the March issue of *The Scientific Monthly* a finely illustrated article on plant distribution in California, in which he devotes special attention to the climatic conditions. The State covers nearly 10° of latitude, extending from 32° 40′ N. to 42° N., and thus lies well within the warm temperate zone. Owing to its situation, however, it is remarkable for its equable climate, and for the slight temperature differences between the extreme north and the extreme south. As illustrating the equability it may be noted that at San Francisco the annual range of temperature is only about 10°, the summers being remarkably cool, with an average temperature of 60° in the hottest month. The town of Washington, which lies in nearly the same latitude, has a mean annual range of over 40°, the summers being much hotter and the winters much colder. As illustrating the comparatively small differences of temperature due to latitude, it may be noted that there is mean annual difference of only some 10° between Eureka on the north west coast and San Diego at the extreme southern end of the State. On the other hand, both temperature and rainfall vary enormously with topography, and the numerous climatic zones within the State are due to the great differences in elevation of its various parts.

As regards the flora, the important general points are the marked differences from other parts of the United States, a peculiarity associated with the isolation of the State, and the number of different associations, which is again associated with the local variations of climate due to situation and topography. In regard to the first point, the number of endemic plants, and the absence of familiar forms found to the east of the Rockies, it is worth note that the high mountains and deserts which bound the State on the east form an impassable barrier to most plants. Again to the south the deserts of Mexico form a barrier to distribution, while on the west there is the Pacific. Professor Campbell compares the State to an oceanic island in its isolation from surrounding areas.

The climate is, of course, of the Mediterranean type, and the flora presents the usual Mediterranean features, that is the abundance of evergreen and xerophytic trees and shrubs, the number of short-lived annuals, which die down before the heat and drought of summer, and the abundance of tuberous and bulbous species, which similarly run through their period of activity during the moister and cooler part of

the year. Where the rainfall is locally adequate, as occurs especially in the north, dense forests are found, while the south-east corner is virtually a barren desert. The article includes some good illustrations of characteristic associations and plants, and gives lists of the more interesting forms.

The Broad Pass Region, Alaska.—Several of the recent *Bulletins* of the U.S.A. Geological Survey are devoted to various parts of Alaska, and *Bulletin* 608, called "The Broad Pass Region, Alaska," contains some points of general interest. Broad Pass is a wide glaciated valley between the head of Chulitna river and a tributary of the Nenana named Jack river. It offers one of the most favourable railway routes from the Pacific seaboard to the Tanana and Yukon basins, and has been chosen by the Government as the route of the railway from Seward to Fairbanks. Since the Chulitna flows into the Susitna on the south, while the Jack river, as already stated, flows into the Nenana, a tributary of the Tanana, the Pass may be said to mark the watershed between the Yukon drainage and that of Cook inlet. In preglacial times the Nenana ran through Broad Pass to the Chulitna, but the glacier which formerly occupied the region diverted it, and since the disappearance of the ice the drainage has not reverted to its earlier course, so that the wide, open pass is left as a "through" valley between the two drainage systems. From the south the approach to the pass is gradual, and railway construction will probably offer no great difficulties. The pass stands about 2500 feet above sea-level, and beyond it the line would follow the Jack river to the Nenana, and the main Alaska range would be traversed by means of the valley of the latter river, which for about ten miles flows through a steep-walled canyon. There are at present no permanent settlements either of white men or Indians in the Broad Pass region, but it is believed that extensive prospecting would lead to the discovery of valuable minerals.

The paper gives some interesting notes on the vegetation and on the possibilities of travel in the region. There are practically no trails, but movement is not difficult either for horses or men, provided the higher ground is used. The best going is generally above timber line, at elevations of between 2800 and 3500 feet above the sea. Here trees and bushes are absent, soft ground is not common owing to the steep slopes, and grass for horses is abundant. On the lower ground the swamps and lakes make travel difficult. Below 3200 feet willows for firewood and tent-poles can usually be found, along the small valleys which incise the mountain slopes deeply, so that suitable camping-sites are obtainable. Further, it is interesting to note that grass, so important to the traveller as horse feed, is absent in the lower parts of the wide valleys and on the gravelly flats of the larger streams, but grows luxuriantly in the small valleys near timber line, that is near the point where willows and alders grow best. The two important grasses are bunch grass and red top. The former cures on the stalk, and thus can be eaten by the horses after frost has killed the more luscious and ranker red top. The date of the first appearance of grass depends on

the locality and on the date of the melting of the snow. On Valdez Creek, a tributary of the Susitna river, the miners turn their horses loose in spring but feed them so long as they will return for forage. As the animals prefer fresh grasses to oats and hay, they do not return as soon as growth becomes abundant, which is usually about the beginning of the second week of May. By the beginning of the second week of September, however, the grasses are killed by the early frosts, and food must be again provided. In addition to grasses, the country supplies some leguminous plants known to the miners by the general name of pea vine. These are not touched by the horses early in the season, but so soon as the seeds have ripened they are greedily devoured, so that the plants supply good forage in the late summer. The region supplies little in the way of human food. There are some berry-bearing plants, but these are not abundant. Game animals suitable for food include moose, caribou, sheep, bear, wolverine and fox, while there are some small fur-bearing animals. Ptarmigan are the chief game birds, but grouse occur in the timbered areas. The clear streams contain trout and grayling, both of which avoid the glacial streams. Trout of large size are found in considerable abundance also in the lakes.

The paper is finely illustrated, with some good photographs and a large scale map of the region described, and also a geological map.

Protection from Frost Damage in the United States.—Mr. W. G. Reed discusses this subject in the February issue of the *Geographical Review*, with special reference to California. The possibility of protection from frost is of very great importance in connection with the cultivation of the more delicate types of plants in the irrigated areas of the States, and great attention has been devoted to it in California and elsewhere. The conditions which have to be guarded against are not those which prevail during the winter months in temperate regions generally, where the whole mass of air has a temperature below 32° F., but are due to strong local cooling under a clear sky, are usually associated with inversions of temperature, and are characteristic of dry and windless regions. The danger to plant life in these cases is increased by the fact that after sunrise the air warms up rapidly, for the same reason which caused it to cool rapidly after sunset, this reason being the ease with which radiant heat passes through clear air. In some cases the plants are resistant to the sudden cooling, if it be not too prolonged, but are seriously damaged by the rapid heating after being exposed to freezing temperatures. Thus theoretically two methods would prevent damage, either protecting the plants from the cold air, or from too rapid warming after exposure to frost. Again, in theory, three methods of protection against frost are available, (1) the artificial warming of the lower strata of the air, or (2) the prevention of the rapid radiation which is the cause of the sudden fall in temperature by the formation of artificial clouds, or by some covering which may take the place of a clouded sky, or, finally, since it is the absence of wind which produces the local "frost-holes," (3) an artificial mixing of the

different layers of the air should prevent damage by frost. In point of fact, at present no feasible mode of mixing the different layers of air has been devised, and in practice all methods of warming the air artificially which can be adopted on the large scale involve to a greater or less extent the production of artificial clouds. In the same way most methods of preventing the access of frost tend more or less to diminish the rapidity of warming after sunrise; the addition of smoke or water vapour to the air, for example, does this. Thus the methods of protection from frost and the prevention of rapid warming are more or less combined in practice.

In California the method of protecting delicate plants, such as orange and lemon trees, usually adopted is that of placing "oil-pots" through the orchards, one oil-pot to each tree. When frost is forecasted, the oil is lighted, and the combustion produces both heat and a certain amount of smoke, which diminishes radiation. In Oregon wood fires are used instead of oil stoves. In some districts hot water is run into the irrigating ditches, but this method is somewhat dangerous, both because of the risk of direct injury to the trees, and because of the danger of starting them into fresh growth, which would be specially liable to frost damage. The method, so commonly used in Italy, of covering the groves, for example with thin screens of open cloth, is also employed, and these protect the plants from too rapid warming with the sun, as well as from too rapid cooling, but the cost makes such methods less suitable in the States. Other methods are to burn wet straw or refuse, which gives rise to a smoky mist, or to spray the orchards with a fine sprinkler, or even to discharge steam into the air, but the oil stoves or wood fires form the favourite method. An essential point, however, is that accurate weather forecasts should be obtainable, if protection against frost damage is to be attempted. Here the information and warnings issued by the United States Weather Bureau are invaluable, especially when supplemented by careful local studies of the places most liable to frost, and the seasons when destructive frosts are to be expected. Emphasis is laid in the article upon the need for local co-operation, for protection is most effective when the same methods are employed throughout a district. Geographically, the important point is the care and scientific method which are being employed in the United States in the intensive cultivation of semi-tropical crops. In parts at least of the Mediterranean area the methods used are much less careful and scientific, and while this occurs the competition of the new lands is likely to be severely felt. The article is illustrated by some interesting photographs of American orchards with the heaters in position and in action.

Australasia.

Expedition to Easter Island.—According to an article in *Nature*, Mr. Scoresby Routledge has recently returned with his party from an expedition to Easter Island. The expedition consisted of Mr. and Mrs. Routledge, and Lieut. R. D. Ritchie (seconded by the Admiralty for

navigation and survey work) and Mr. F. Lowry Corrie, geologist. The last-named was, however, unfortunately invalided home from South America, and was thus unable to take part in the work of the expedition. The expedition received grants from the British Association and the Royal Society, but Mr. Routledge had built and fitted at his own expense the schooner *Mana*, of 126 tons, in which the party sailed from Southampton to Chile *via* the Straits of Magellan, and hence to Easter Island. The party arrived at the island on March 29, 1914, and did not leave till August 1915, making a stay of sixteen and a half months. The special object of study was the antiquities of the island, notably the stone platforms on which formerly stood the enormous stone statues for which Easter Island is famous. The stone carvings and stone-built houses were also studied. On the return journey Pitcairn, Tahiti and the Sandwich Islands were visited, where material for comparison was obtained. It is hoped that a full account of the results of the expedition may be given at the Newcastle meeting of the British Association this summer.

Polar.

Antarctic Meteorology.—Mr. H. Mohn discusses in the *Scientific Results* of Captain Roald Amundsen's expedition the meteorology of the expedition. Perhaps the most interesting general point in the pamphlet are the statements in regard to pressure conditions. It was found that on the journey from the station at Framheim towards the Pole the pressure rose over the Barrier to latitudes 85° and 86°, indicating an anticyclonic state with lower pressure in lower latitudes. The winds were mainly from the SE. and cold. On the other hand, over the Plateau the pressure was rather low, the winds from the SSE. and of relatively high temperature. There was a pressure gradient towards the NE., indicating the existence of low pressure centres in that direction, and there was considerable precipitation. These observations confirm the view previously expressed by Professor Meinardus that the Antarctic anticyclone is only distinct at sea level, while above a certain altitude the pressure is not higher but lower than in surrounding regions, so that a cyclonic area lies above the anticyclonic one.

General.

Climate of the Eastern Mediterranean.—Major H. G. Lyons contributes to the April issue of the *Quarterly Journal* of the Royal Meteorological Society an article on the winter climate of the Eastern Mediterranean and surrounding areas, which contains some facts of great interest. He points out that the eastern part of the Mediterranean basin includes two very different climatic regions. Greece, the Ægean Sea, the western part of Asia Minor, the Levant and Lower Egypt, fall into the zone of the typical Mediterranean climate, but the northern shore of the Ægean forms a transition belt between this climatic type and the strongly continental form which prevails over Bulgaria, Roumania, and Southern Russia. In the last-named region the rainfall

is distributed throughout the year with approximate uniformity, but June and November show slightly greater precipitation than the other months. The special feature, however, is the prevalence of very low winter temperatures, and the fact that the ground may be snow-covered for the greater part of the months of December, January, and February. The details given as to the snowfall are specially interesting. In the Bulgarian highlands snow falls on an average on one-third of the days of the three months named, and lies on the ground for more than two-thirds of the quarterly period. In a severe winter the ground may be uniformly snow-covered for the whole three months. The snowfall occurs chiefly during the prevalence of the north-easterly winds which blow in the rear of passing depressions. As contrasted with these conditions it may be noted that at Constantinople snow falls on an average on eighteen days every winter, in Salonika on four, and in northern Greece generally on an average of six, though this rises to nine at Trikkala.

In winter the eastern Mediterranean Sea forms a low-pressure area, due to the constant passage of depressions from east to west, the depressions which bring the normal winter rainfall to the Mediterranean lands. On the other hand, a high-pressure ridge lies over the Balkans and Southern Russia, and another over North Africa. The existence of the first-named high-pressure area favours a general north-to-south flow of air in winter over Greece and the Ægean Sea, but this current is constantly interrupted by the passage of the depressions, which, as they approach, and also when they pass on to the northward, cause southerly and south-westerly winds to prevail. As these depressions diminish in number as the season advances, the southerly winds of winter give place to the northerly winds of summer, which may prevail for weeks together. In contrast to the frequently strong winter winds of the Ægean, it is to be noticed that in the southern Balkans calms and light winds prevail, the latter being generally between north-east and north-west in direction. The passage of the depressions to the south, however, gives rise to occasional southerly and south-westerly winds. The stillness of the atmosphere over the Balkan area in winter has a considerable effect on the winter climate of the regions further south. During the prevalence of calms or light winds there, the skies are clear, the night temperatures very low. A great mass of air is thus cooled down to a very low temperature, and the southerly gradient starts a flow of this cold air over the edge of the high ground, whence it pours like a torrent into the lower and warmer region of the Ægean Sea. The initial temperature of the air is so cold that it arrives off the coast of Greece as a cold wind, in spite of the dynamic heating, and it is thus comparable to the bora of the Adriatic. Sir Napier Shaw has suggested the convenient name of "katabatic" for such winds, in contrast to the usual "geostrophic" winds which blow along the isobaric gradient. The katabaric winds from the Balkan highlands may reach gale force, and are characterised by their dryness, their gusty character, the associated low temperature, and the long duration, which may extend over five, six, or more days, or as long as there is sufficient cold air to feed them. These

winds are responsible for some of the winter gales and stormy weather in the Ægean, and also for the low winter temperatures of places on the North Ægean, where Salonika, for example, in the latitude of Naples, has experienced a January minimum of 14° F. It is noted that in 1903, during a cold spell which lasted for several days, a thin sheet of ice was observed over a large area in Salonika harbour, a very extraordinary fact in a Mediterranean port.

Not all northerly gales in the Ægean are, however, due to katabaric winds, for the passage of a depression from west to east to the south of Greece may cause a northerly gale in the Ægean. Other gales are due to the approach of depressions over Greece and the Ægean, and then the strong wind comes from the south. As contrasted with the other type of gale these are short-lived, and as the gale drops the weather becomes colder. The passage of these depressions induces mild and showery weather in the Balkan area, followed by colder weather and snow, as the cyclone passes onward. It is noted that the effect of the passage of these depressions is to make average monthly temperatures for Balkan stations somewhat deceptive, for the increased temperature due to their passage raises the average notably, so that it ceases to give an accurate picture of the more usual temperature conditions.

Obituary: Professor A. Woeikoff.—We learn from the issue of the *Annales de Géographie* for March 15 that Professor A. Woeikoff, of the University of Petrograd, died at the end of January last. Professor Woeikoff was specially noted as a meteorologist, being the author of a monumental work on the climates of the earth, which was published in Petrograd in 1884, and shortly afterwards translated into German. His later works dealt more with geography proper, and his interesting book on Russian Turkestan was reviewed here in vol. xxxi. p. 35. In addition he published, especially in French geographical journals, a number of papers on general geographical subjects, several of which have been noted here at different times. He travelled widely, especially in the New World, and was remarkable as a linguist, not only speaking and writing French with perfect ease, but having a wide acquaintance with a number of other languages in addition. Those who were present at the Geographical Congress at Geneva will remember his picturesque figure, and his enthusiasm for vegetarianism, a cause to whose propagation he devoted much zeal. In an article which was abstracted here in vol. xxvi. p. 270, he discussed the subject from the geographical standpoint, maintaining that as the world becomes more densely peopled man will require to depend more and more upon the vegetable kingdom for food. His loss, which is that of an original and independent thinker, will be greatly felt in the geographical world.

Meeting of the British Association.—The provisional programme of the eighty-sixth annual meeting of the British Association, to be held at Newcastle-on-Tyne from Tuesday, September 5, to Saturday, September 9, is now ready. Sir Arthur Evans, F.R.S., will deliver his presidential address on the evening of Tuesday, September 5. The reception-room

will be in the College of Medicine, and some of the section rooms will also be there, while the others will be conveniently accessible. Mr. D. G. Hogarth is to be president of Section E (Geography). We understand that it is hoped to devote one day in Section E to a discussion of Balkan problems.

Commercial Geography.

Rhode Island Coal.—The U.S.A. Geological Survey devotes a recent *Bulletin* (No. 615) to the Rhode Island coalfield. The presence of coal in this region has long been known, for the beds outcrop in the low cliffs which border Narrangsett Bay, and occur near the surface in many other parts of the State and in the adjacent State of Massachusetts, and coal was worked near the town of Providence as early as 1768. The fact that the beds occur on the seaboard, in a region of dense population and extensive manufactures, would seem to make the coalfield one of great importance, but nevertheless constantly repeated efforts to work the coal have led to disappointment. The reason lies in the character of the coal and the nature of the beds. The coal would appear to have been originally laid down in beds of moderate thickness, but these beds have been folded, compressed and squeezed by pressure, so that the coal lies in pockets in some places, and elsewhere disappears, while quartz and other impurities have been introduced into the seams. As the result of these movements the coal has undergone great modification, in some places becoming pure graphite. Elsewhere it is anthracitic, but it is always characterised by a high ash content, high moisture content, and high specific gravity. It is difficult to ignite, is liable to snap violently and to explode, clinkers badly, and has other qualities which render it useless for household purposes. Similarly it is of little value as a means of generating steam, and attempts to use it in the manufacture of briquettes have been unsuccessful. It is believed that the only prospect for successful use is in the production of electric power at the mines. Geographically the subject is of some interest as showing that the mere fact that coal-bearing strata crop out in a particular locality, even in a densely peopled locality, cannot in itself be taken as evidence that the beds will have economic importance.

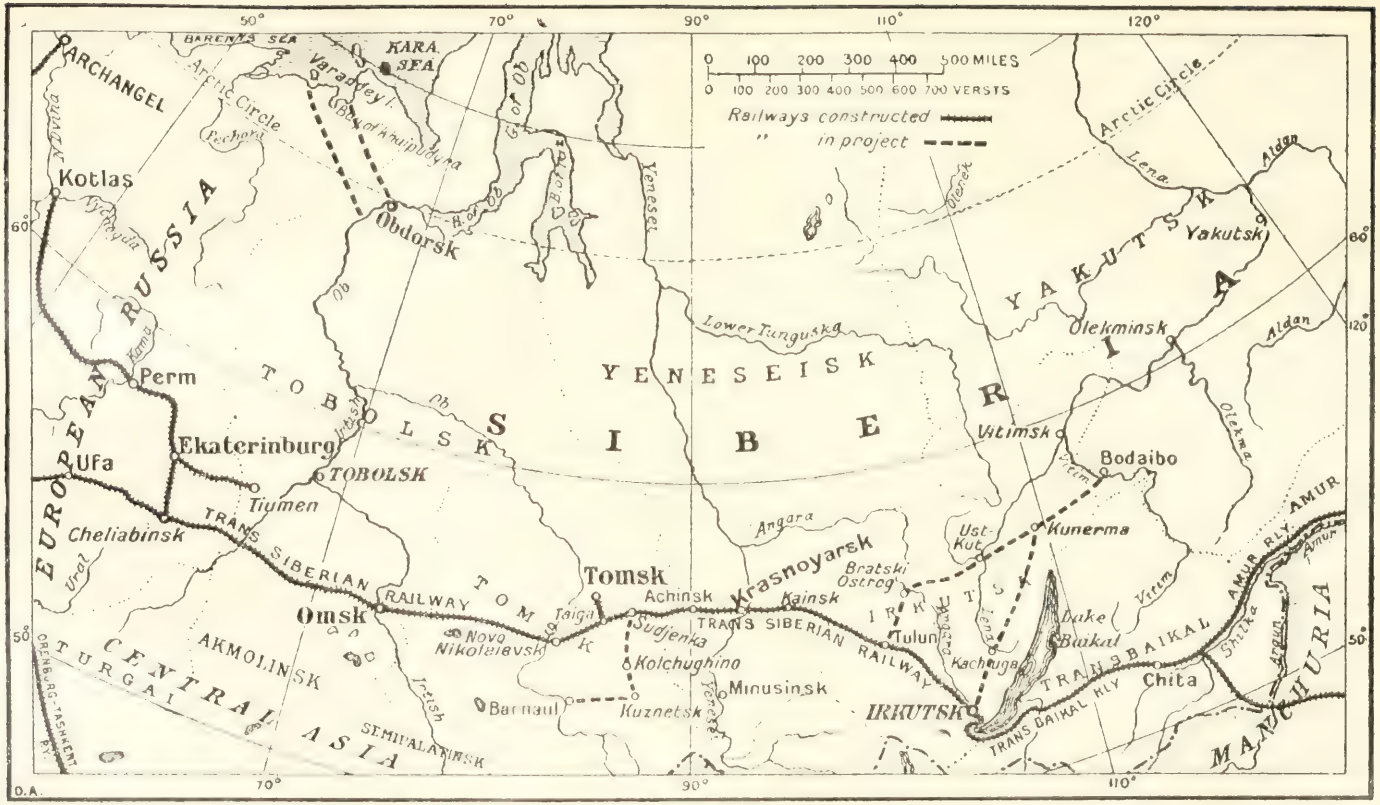
Proposed New Railways in Siberia (*With Sketch-Map*).—An article in the *Times Russian Supplement* describes a number of new railway schemes intended to connect the important mineral regions of Siberia with the Trans-Siberian, and to aid in the economic development of the country. The accompanying sketch-map is reproduced, by permission, from the article.

The first scheme involves the linking up of the Lena gold district and the Vitimsk mining area with the Trans-Siberian. Here there are two proposals. One contemplates the construction of a railway from Irkutsk to Bodaïbo, the centre of the gold district, through Kachuga and Kunerma. The length of this line would be 790 miles. The other scheme involves a line from Tulun, on the main line, to the Angara,

thence to Ust-Kut on the Lena, and so to Bodaïbo *via* Kunerma. This line would have a length of 1000 miles and would reach the Lena at its highest navigable point. Meantime it has been decided to construct a line only to Ust-Kut. The region which will thus be opened up is rich in minerals and also in timber. Another scheme, also illustrated on the map, would connect the rich coalfields of Kuznetsk with the Siberian main line, and will also serve the rich agricultural district round Barnaul. It is hoped that, with railway connection, the last-named town may become the most important meat market in Russian Asia. Another proposed scheme, in regard to which no decision has yet been come to, would join the lower Ob with some point on the shore of the Barents Sea. This line would leave the left bank of the Ob at Obdorsk, and go through the lower hills of the Northern Urals and the river Khadeta to the bay of Khaipudyra, or alternately would leave the Ob to the south of Obdorsk and reach the Samoyede shore, where a port is to be constructed near the island of Varandey. The length of the proposed line would be about 290 miles. Such a railway would provide a way to the open sea for the goods of Western Siberia, and especially for corn or timber bound to Northern Russia. This corn has now to come at great expense by the Northern Siberian line to Kotlas on the northern Dvina, whence it is forwarded by small river boats to Archangel. By the proposed railway goods could be forwarded direct to an ice-free port during five months of the year.

The Udi Coalfield in Southern Nigeria.—It is announced that the coal which was discovered in the course of the mineral survey of Southern Nigeria, at Udi, has been worked to an extent sufficient to show that the deposits are valuable, and may have a great influence on the future development of the country. Ten thousand tons of the coal have been mined, and it has been tried on the Nigerian railways, where it is favourably reported on as a locomotive fuel. The deposits seem to extend over an area of not less than 2100 square miles, and some of the seams are five feet thick. The beds lie near the new Nigerian eastern railway from Port Harcourt, and when this railway is open, which should be this year, the coal will be immediately available for the whole of Nigeria.

A New Salt Industry in Chile.—An article in the January issue of the *Bulletin* of the Pan-American Union describes the salt-mining industry which is carried on at Lagunas, on the nitrate desert of Chile. The nitrate desert, it will be remembered, lies between the Western Andes and the coast range, and is characterised by its extreme aridity. On the general surface of the desert are depressions, or *salars*, which mark the site of vanished salt lakes, and have their surface covered with deposits of common salt, mingled with rock detritus and dust. The salt is too dirty to be used in its natural state, but an ingenious method has been devised by means of which it is obtained at small cost in a very pure condition. Further, owing to the fact that the valuable nitrate beds lie on the higher ground round the salars,



Proposed new railways in Siberia.

means of communication are available, by which the salt can be carried to the port of Iquique without great cost. The method adopted depends upon the fact that, despite the great aridity of the region, the water table is remarkably high, for there is a constant flow of underground water from the distant Andes towards the sea. Wide ditches or pans are dug in the salars, and the underground water is struck at a depth of from 3 to 3½ feet below the surface. The ditch is then carried eight inches below the water level, and as a consequence the salt-containing water within is exposed to the strong sunshine and dry winds. The saturation point is soon reached and salt begins to crystallise out. Fresh supplies of water "seep" in and the crystallising process is continued till the salt has accumulated to a depth of eight inches, when the ditch becomes dry. The salt is then shovelled out by hand, left to drain and dry on the bank, and packed into sacks for transport. It is stated to be beautifully white in most cases, and fit for table use. As soon as the salt has been removed new supplies of water ooze into the ditch, and the same ditch will supply three "crops" of salt in the year. The industry was only established ten years ago, at first on a very small scale, but now the output is about 10,000 tons per annum.

The Cultivation of Sponges in the West Indies.—According to a note in *Nature*, a recent issue of the *West Indian Bulletin* gives an interesting account of the growing of sponges for market in the waters round the Caicos Islands, near Jamaica, and also off the coast of Florida. The sponges which occur naturally in the seas round the West Indies have little commercial value, and cuttings of more important species are imported. Off Florida these cuttings are fastened by metal clips to cement discs, which are then sunk and the sponges left to grow, but off the Caicos Islands slabs of coral are employed. The crop is ready for harvesting in one to four years, according to the variety grown, and it is estimated that it only costs about £4 to plant, harvest, and market one acre of sheep's wool sponges. This variety takes four years to mature, and yields £116 per acre in the New York market, so that there seems to be a large margin of profit, but the estimate makes no allowance for the cost of management. At Caicos the growers prefer the small reef sponges, for, although less valuable, they mature in twelve to fourteen months, and give an even better return on capital.

The World's Supplies of Quinine.—The January issue of the *Bulletin* of the Pan-American Union contains a finely illustrated article upon quinine, which, in addition to recapitulating the familiar history of the introduction of the cinchona plant into India by Sir Clements Markham, brings forward some new points. The war has led to a tremendous demand for the drug to supply the armies in the field. Owing to the way in which the cinchona trees have been recklessly cut down in Peru, Ecuador, Bolivia, and Columbia to obtain the bark, the amount furnished by the natural forests in these countries has become small, and the world supply is chiefly due to the plantations

in Jamaica, India, Ceylon, and Java. In these plantations the bark is taken off the trees in strips, bands of untouched bark being left between the strips. The trunks are then bound up with moss, and beneath this covering the bark is renewed, so that the trees can be made to yield a yearly crop of bark for many years. Some good views are given of plantations in India and Java, these showing the size attained by the trees and the process of bark-stripping. At present the product of the plantations in the British Empire is practically reserved for the armies of the allies, while the Central Powers presumably obtain their supplies from the Dutch plantations. One result has been that the United States and other neutral nations are finding it very difficult to obtain the drug, and prices have gone up in the States from 20 cents per ounce at the outbreak of war to $1·50 per ounce at the end of last year. The fact that the plantation product has virtually driven the forest product out of the world market is interesting economically, and it is further remarkable that, except for small attempts by German settlers in Bolivia, little effort has been made to start plantations in the native habitat of the tree. One effect of the rise in price may, however, be to induce the governments of Peru, Ecuador, Columbia, and Bolivia to take steps to start cultivation in these countries.

EDUCATIONAL.

It is stated in the *Times Russian Supplement* for May 27 that the University of Cambridge has arranged for a series of lectures on Russia to be delivered at the Cambridge Summer Meeting this year. Mr. H. Yule Oldham is to lecture on the geography of Russia, Dr. Harold Williams on the nationalities of Russia, Professor Peter Struve on Russian economics, and a large number of other lectures are announced on different aspects of Russian history, modern life, literature and art. It is hoped that several of the leading scholars of Russia will take part in the meeting. Lectures on Poland are also to be given. Full details will be supplied by the Rev. Dr. Cranage, Syndicate Buildings, Cambridge. Letters should be endorsed "Summer Meeting."

Reader in Geography at Oxford.—It is announced that owing to circumstances connected with the war, the election of a Reader in Geography at Oxford (cf. p. 201) has been postponed till further notice.

NEW BOOKS.

EUROPE.

The Self-Discovery of Russia. By J. Y. Simpson, D.Sc. London: Constable and Co., Ltd., 1916. *Price 6s. net.*

Professor Simpson is a well-known authority on Russia and the Russians, his first book, *Side Lights on Siberia*, being the result of his journey in Siberia during

the summer of 1896. The present volume contains his studies made during a visit to Russia last summer. Like Mr. Stephen Graham, Professor Simpson is distinguished by his intense sympathy and regard for Russia, whom he hails as "merciful in victory, patient and calm in tribulation, and with the vision to act and to endure."

He points out that "there is a very real sense in which Russia will gain more out of the war than any other of the Great Powers involved, since she will have evolved politically in its few years through stages that have taken other countries centuries to pass. . . . What above all was necessary in Russia was not so much liberty of speech or of the Press, as liberty of sound action, and that she has been given as at no other stage in her history." He continues, "The work of the Unions of the Towns and of the Zemstvos in this war has been one of the most remarkable features in the process of self-discovery which has been stimulated by the war." "From the beginning of the war to July 1st, 1915, 280,000 sick and wounded—60 per cent. of the whole—passed through, or stayed in, the Moscow Zemstvo institutions alone." The Municipality of Petrograd provided for 25,000 beds for the wounded, and 15,000 others have been furnished between the Red Cross and the military,—40,000 beds in all. The same Municipality gave 2½ million roubles (£250,000) as a provision for the wives and families of soldiers, and the Government allowed an equal sum for Petrograd alone. Besides all this, the Unions of the Towns and Zemstvos had to succour the great number of refugees, at first from hostile, but latterly from Russian territory, fleeing from the seat of war, and to provide, as they did generously, for the 800,000 German and Austrian prisoners interned in Central Russia from Vologda onwards into Siberia.

The author considers that the present Tsar deserves the title "Liberator" more than Alexander II. (who freed the serfs), because he prohibited the sale of vodka, by which every aspect of Russian life has been changed. One Petrograd factory-owner employing 4000 hands told the author that the efficiency of his men had noticeably increased from 10 to 15 per cent. He also noticed an improvement in their dress and a marked increase in their self-respect. Thirty-seven correspondents said that Hooliganism had quite disappeared and that police houses of detention were empty, for there were no drunkards. The author gives elaborate statistics on this subject.

Then he takes us to the Galician front and describes what he saw there, the chapter being illustrated with numerous reproductions of military photographs. He declares that "the Russian army is the greatest Democracy in the world," —officers addressing their men as "Brothers," and privates their officers as "Little Uncles." There is a relationship of infinite good humour between officers and men that never fails. Song plays a great part in the Russian soldier's life, and singers are often put at the head of a column on the march.

A chapter on the "Future of Poland" contains an important statement made by Polish representatives in 1915 at a conference under the presidency of the Prime Minister of Russia. They pointed out that Poland is Roman Catholic and Russia is Greek Church, and maintained that "a country where the mass of the population is Roman Catholic will never become Russian." However, Professor Simpson considers that, "on the whole, the Russian Poles are on the side of Russia." His essay on "Religion in Russia to-day" introduces the opinion of a friend, "now an old man, and a layman holding high office in connection with the Holy Synod," who insisted that the Tsar is the protector but not the head of the Russian Greek Church, and that "the head of the Church is Our Lord," whereupon Professor Simpson remarks, "I came to see that" on this point "the views of the Oriental Orthodox Church and of the United Free Church of Scotland were practi-

cally one." His aged friend added that "Churches like the Anglican Church and the Greek Church have more psychological affinity with one another than with Rome."

In his concluding chapter on "Russia and Constantinople," the author emphasises the necessity to Russia of having a free passage through the Straits for her produce. Russia exports by that route about 90 per cent. of her wheat, 85 per cent. of her barley, 95 per cent. of her manganese, 80 per cent. of her naphtha products, 55 per cent. of her iron ore, and 45 per cent. of her methylated spirits. He reminds us that "the open Straits mean cheaper food for Britain," and assures us that "Russia would never close the Straits without the most serious reason, because it is she herself who would feel first and most deeply the effects of such a step."

Altogether, the book is a "book for the times," and will appeal all the more to Scotsmen as it is by one of themselves who, following the wandering propensities of his race, has laid bare many of the secrets which have hitherto enshrouded the magnificent Empire of Russia.

Germany Before the War. By Baron Beyens, late Belgian Minister at the Court of Berlin. Edinburgh: Thomas Nelson and Sons, 1916. *Price 3s. 6d. net.*

This is one of the most valuable publications produced by the present war. It is indeed of permanent value, as it explains why and how the war took place. Its author's official position at Berlin from 1912 onwards to the declaration of war in August 1914 enabled him to form at first hand a reasoned opinion regarding the causes which induced Germany to destroy the peace of Europe. He is able to express what he saw and heard in clear and elegant language, and Mr. Cohn has made an admirable translation from the original French. If we wish to understand the Court and Government, the Army, Navy, and political parties of Germany before the war, and to behold the leading actors in the drama which convulsed Europe, we must turn to this book. It is a historic document which casts a searchlight upon the conspiracy which was hatched in Berlin years before 1914.

The author has no hesitation in laying the blame for the war upon the Kaiser Wilhelm. He says, "The Emperor, together with the military authorities whose advice he took, wished to profit by a juncture which he had awaited with longing and which fickle Fortune might never again offer to his ambition. Everything proves it, down to his feverish haste, as soon as M. Sazonoff's reply was conveyed to him, to learn the intentions of England, and to suggest, on that very day, a bargain that might purchase her neutrality. This is why Herr von Bethmann-Hollweg received orders to summon the British Ambassador on the night of the 29th July 1914. The Emperor could not wait until the following morning, so eager was he to act. Is this impatience the mark of one who was the victim of a concerted surprise? If he had not wanted war, would he not have tried to resume negotiations with Russia on a basis more in keeping with her dignity as a Great Power, however heavy a blow it was to his own pride that he had failed to intimidate her?" He declared war on Russia on 1st August and on France on 3rd August 1914.

The only criticism we would offer on this admirable work is that, while Baron Beyens refers to General Bernhardi's book as "most prophetic" of the coming war, he makes no mention of the fact that, during the same year (1912), his Belgian compatriot Dr. Sarolea published at Edinburgh his well-known *Anglo-German Problem*, in which he solemnly warned Europe that it was "drifting slowly but steadily towards an awful catastrophe which, if it does happen, will throw back civilisation for the coming generation"; adding, "The Prussian menace is more

threatening than ever. And until that menace is removed, and as long as the Prussian spirit shall prevail in the councils of the German Empire, it behoves us to be vigilant, and not to forget that European liberty and European democracy are still at the mercy of military force and political tyranny."

La Turquie et la Guerre. Par J. AULNEAU. Deuxième édition revue. Paris: Félix Alcan, 1916. *Prix 3 fr. 50.*

This volume, which has a preface by M. Stéphen Pichon, gives a concise account of the Turkish Empire from the time of the entry of the Turks into Europe to the present war. The method adopted is to consider first the founding of the Turkish Empire in Europe, then its dismemberment, which involves separate treatment of the independent states which arose with the wane of Turkish power. There follows an account of the attempt to galvanise the apparently dying state into new life by the reforms of the Young Turks. Under the heading of the Check to the Reforms are described the difficulties encountered by the Young Turk party in dealing with the Macedonian, the Albanian, the Syrian, and the Armenian questions, difficulties which played their part in bringing about the Balkan wars, which in turn are discussed in detail. Upon this follows a chapter dealing with the Eastern Problem in its relation to the Great War, in the course of which the attitude of Austria to the Slavs of the Balkan peninsula is fully treated. In the course of this chapter there is a very careful discussion of the various railway schemes put forward by the different parties interested in the peninsula. The relations of Germany and Turkey are also considered in detail, no less than the events which immediately preceded Turkey's entrance into the war.

The final chapter, dealing with the questions which will remain for decision in the event of the victory of the Allies, is cautious in the extreme. Like most prudent men the author recognises the profound difficulties in the way of a stable settlement in this much-vexed region, and like Mr. Hogarth in *The Balkans*, reviewed here on p. 202, M. Aulneau is content to state the difficulties rather than to present a ready-made solution. "The Eastern Question," he says, "arose before the Turks entered Europe; is it likely to cease to exist after their return to Asia?" His positive contribution consists in a criticism of the three treaties which, he says, have organised modern Europe, and which bore within them the germs of future wars. The treaties of Westphalia, ostensibly directed against the house of Austria, strengthened Prussia in Germany and the small German states too much; they prepared the way for German unity. The treaties of Vienna had for object the obliteration of the hopes of certain races. These treaties enriched Germany and Austria, and consecrated the partition and domination of peoples. The treaty of Berlin was a direct attack on the rights of nations and on the expansion of the Slavs, a denial of justice to the peoples on whom it was imposed —it was a triumph of germanism. "At Berlin, as at Vienna, the assembled diplomats arbitrarily displaced the rational limits of states, weighing and balancing populations according to their strategic combinations, provoking the hates and the disturbances of the future. Thus the political situation of Central and Eastern Europe rested upon the oppression of races; herein lay a ceaseless cause of conflicts. The work of Vienna and of Berlin must be done over again; no state in Europe should have predominance at the expense of others, and all the states must in future reckon with popular forces, with national claims: no longer must the Balkans and the spire of Strasburg dominate European politics."

We recommend the book cordially for its careful and dispassionate study of the complicated problems with which it deals.

The Luck of Thirteen. By Mr. and Mrs. Jan Gordon. London: Smith, Elder and Co., 1916. *Price 7s. 6d. net.*

No review could do justice to this fascinating volume. Absolutely informal, quaintly simple, intensely interesting, this account of "wanderings and flight through Montenegro and Serbia" is in its own way a masterpiece. Behind the naive style there lies much real stuff, and for it we are grateful. The "flight" is splendidly done, and careful reading between the lines will give us much insight into the pitiable condition of the Serbs during the retreat before the Germanic hosts. As is to be expected, the illustrations—photographic and coloured—are very good, but we would particularly ask the reader to note the piquant tail-pieces.

ASIA.

From Moscow to the Persian Gulf. By Benjamin Burgess Moore. New York and London: G. P. Putnam's Sons, 1915. *Price 10s. 6d. net.*

Mr. Moore calls his book "the journal of a disillusioned traveller," and these words furnish a kind of keynote to his narrative of what must have been an arduous journey; for the traveller in the interior of Persia, even in these days, must have much to put up with, and it seems doubtful if a sight of the few remains of the glories of ancient Persia suffice to atone for the deadly monotony and the bodily discomfort to be endured by the way.

Starting from Moscow, by rail through Russian Turkestan, Mr. Moore crossed the frontier into north-eastern Persia at Askabad, and it was after he left the railway at Askabad that his real troubles began. We do not find much mention of the Russian rulers in Turkestan, unless in the shape of complaint of tedious formalities as to passports, etc. Mr. Moore, it seems, was suspected of being a British officer, and, as such, was not particularly welcome. It should be noted that he began his journey in February 1914, before our alliance with Russia had been cemented by the war, and also that he makes no secret of his dislike to Russian methods of control.

Regarding Samarkand, Mr. Moore says that no vestige is left of the ancient city, the seat of learning and the capital of Timur, "other than the splendid fragments of a few great monuments." The Russian quarter he describes as "a tawdry town, typical of the commercial life of to-day." The object of his pilgrimage here was to visit the tomb of Timur—the Tamburlaine of the Elizabethans—and he says "it is impressive to find the tomb of this fourteenth-century conqueror, the Asiatic Napoleon, still visited by many in this strange twentieth century." For a description of the tomb itself we must refer readers to the book.

Mr. Moore is a lover of Persian poetry, from which he quotes frequently and with appropriate effect; he appears to have been steeped in Persian lore, from the early days down to the time of the travels of Pierre Loti, and the dream of his life had been to visit Persia and to gaze on its cities and world-famed gardens. To accomplish this he undertook the toilsome journey across Persia from east to west from Mashad to Teheran; and north to south from Teheran to Bushir. His disillusionment was rendered keener by his toil, for, if he is to be trusted, Persia is indeed a dismal abode of an effete and degenerate people. "Anything so waste and unlovely as these Persian landscapes I have never seen; there is not a tree or a shrub except around the rare villages. . . . At every turn disease, decay and death stalk unmasked. Journeying with enforced slowness, the mind wearies and aches physically, until it feels as blighted as the land itself."

Arrived at Teheran, he remarks that "a more uninteresting place than the capital of Persia it would be difficult to discover," and he finds the most admirable thing in it to be the British Legation. He says, "residence here must surely be a

trial to all Europeans—except members of the British and Russian Legations, whose endless game of political chess probably makes life exciting. To outsiders this contest is not pleasant to watch ; for a visit to Tihrān confirms the impression that, however degenerate Persians may be, they have never—since the revolution—been given a decent opportunity to attempt reforms, without the interested dictation of the Powers. Germany's incredible and all-reaching influence has probably been at work in subterranean channels ; Russia has openly hectored and seized everything of value ; while Great Britain has been compelled by political necessities of irresistible force to violate her best traditions, and, in the words of an Englishman, play the ignoble rôle of lending respectability to the proceedings." In another place he says, "unattractive though Persia be, it is impossible not to be deeply moved by the suffering and abject misery that stare travellers in the face at every turn. Strangled by the Great Powers (one of them a champion of liberty, in this case forced to violate all her best traditions) and plundered within by brigands and corrupt officials, this is to-day the most *hopeless* country I have ever seen."

At Nishapur Mr. Moore turned aside to visit the tomb of Omar Khayyām, who, like other prophets, has not much honour in his own country, and his tomb was in the usual condition of dirt and neglect. But the author seems to have got some consolation for his disillusionment in other respects by his visit to Persepolis and the halls of the Achaemenian kings, the ruins of which still preserve traces of their former magnificence. The audience hall is called by the Persians the throne of Solomon, "for the name of the Achaemenians, even of Cyrus the Great, is unknown to those who dwell in the lands where once they ruled ; whereas the fabulous fame of Solomon has stirred popular imagination to a point where it attributes to him all vestiges of splendour." Similarly Mr. Moore says of the tomb of Cyrus the Great, "there is mockery in the fact that it is now known as the tomb of the mother of Solomon, and is surrounded by the graves of Muslims."

Mr. Moore refers with gratitude to the kind and courteous treatment which he received at the hands of British officials in Persia, of whose kindness and courtesy to the traveller he speaks feelingly.

Although it is a story of lost illusions, Mr. Moore's book is to be recommended as affording a graphic picture of the Persia of to-day, while the numerous illustrations, from photographs, help the reader to realise scenes amid which the author spent such a very arduous and unpleasant time, and as to which he expresses a hearty wish that he may never see them again.

Twenty Years in Baghdad and Syria. By Canon J. T. Parfit. London : Simpkin, Marshall, Hamilton, Kent and Co., Ltd., 1916. *Price* 1*s.*

This interesting little book consists of a collection of articles which appeared originally in the *Evening News*. On the title-page the sub-heading—"Showing Germany's bid for the Mastery of the East"—explains sufficiently the intention of the booklet. The author knows the Near East thoroughly, he has watched with observant eyes Germany's insidious progress there, and he has the faculty of saying what he has to say in an easy style. We recommend especially the perusal of chapters ii., v., vii., and viii., but the whole brochure is well worth careful reading.

AFRICA.

The German African Empire. By A. F. Calvert, F.C.S., etc. London : T. Werner Laurie, Ltd., 1916. *Price* 6*s. net.*

This is a timely volume by a recognised authority. In Mr. Calvert's book, with its excellent maps and illustrations, we find a wealth of information regarding

the four tracts in Africa colonised by the Germans—German South-West Africa, German East Africa, Togoland, the Cameroons. The story of the attempts at colonising, the account of the resources of the various regions, the physical configuration, the climate, the future value of the areas under survey, are all dealt with most adequately. It seems clear that the manual will come to be regarded as the first and most complete attempt to bring together within reasonable compass an accurate and well-informed account of Germany's late colonial empire, and as such it deserves careful attention.

"Verb. Sap." on going to West Africa, Northern and Southern Nigeria, and to the Coasts. By Captain Alan Field, F.R.G.S. London: Bale, Sons and Danielsson. *Price* 2*s.* 6*d. net.*

The title of this book, especially as amplified by the following note on the cover, "being information such as is needed by all who are going to the west coast of Africa," sufficiently explains its contents. It is an excellent, practical, and so far as we have been able to test it, remarkably accurate compendium of information in regard to equipment, means of preserving health, diet, social life, and so forth, for those whom duty or scientific zeal takes to West Africa. The instructions given are clear and precise, and the treatment of *e.g.* malaria and its prevention is entirely in agreement with the most recent research. In regard to style, the author disarms criticism by a curt sentence in his preface, "no literary merits are claimed for '*Verb. Sap.*'" At the same time we cannot help feeling that when Captain Field has so much to say that is worth saying, it is a pity that he should not give a little more care to such matters as the division of paragraphs and the arrangement of his sentences. The book contains some interesting photographs and a sketch-map.

GENERAL.

The World we Live in. Edited by Graeme Williams, F.R.G.S., F.G.S., F.Z.S. 4 vols. London: The Waverley Book Company, Ltd., 1916. *Price* 34*s.*

This new publication, of which two volumes have been issued, is a popular account of the earth as the home of man. Strictly speaking it is not a geographical text-book, but rather a successful attempt to give a reasonable and readable account of the structure and surface of the earth. Volume i. and some thirty pages of volume ii. deal with material which was utilised more largely in the old physiography than it is in modern physical geography. This applies most of all to the geological portions. It is to the advantage of the general reader that this account is given, for the origin of our planet is a frequent topic of discussion. From a geographical and even a logical point of view chaps. 8 and 9 should precede chaps. 5, 6, and 7; but the contents of all the chapters are excellent so far as they go, and they go as far as the general reader need be taken, or the average teacher of geography will care to follow.

Volume ii. deals with Australasia and Africa. Of both the treatment is sufficiently thorough. Though in neither case is there a modern regional study, regions are indicated, and the teacher will be able to select the matter that appeals to him. On page 356 the paragraphs dealing with the "Mediterranean" rainfall of Australia require revision. This rainfall is not due to a southern extension of the SE. Trade Winds, but to a northern extension of the Brave West Winds. Sir H. H. Johnston gives an excellent account of Africa, made additionally realistic and enjoyable by many personal touches and anecdotes.

Illustrations are numerous; very many of them of real interest and value. Several of Sir H. H. Johnston's photographs and sketches are unique, and add to the value of the work.

Written by a staff of specialists, well printed on good paper, and fully illustrated, the volumes should prove a useful stand-by for the teacher and a valuable accession to the school library.

BOOKS RECEIVED.

An Introduction to the Grammar of the Tibetan Language, with the texts of Situ Sumtay, Dag-je Salwai, Milong, and Situi Shal-lung. By SARAT CHANDRA DAS, C.I.E. Demy 4to. Pp. 340. *Price* 15*s.* Darjeeling, 1915.

The English Lake District. By M. J. B. BADDELEY, B.A. (Through Guide Series.) With 18 Maps, Panoramas, etc. Twelfth edition. Crown 8vo. Pp. xxxiv + 274. *Price* 5*s. net.* London: Thomas Nelson and Sons, 1913.

Essentials of Geography. By ALBERT PERRY BRIGHAM, A.M., and CHARLES T. M'FARLANE, Ph.D. First Book. Small 4to. Pp. 266. *Price* 3*s.* Second Book. Small 4to. Pp. 426. *Price* 5*s.* New York: American Book Company, 1916.

The Year-Book of Wireless Telegraphy and Telephony, 1916. Demy 8vo. Pp. 864. *Price* 3*s.* 6*d. net.* London: The Wireless Press, Ltd., 1916.

Men of the Old Stone Age: Their Environment, Life, and Art. By HENRY FAIRFIELD OSBORN. Small royal 8vo. Pp. xxvi + 545. *Price* 21*s.* London: G. Bell and Sons, Ltd., 1916.

The Geology of the Lake District. By J. E. MARR, Sc.D., F.R.S. Small royal 8vo. Pp. xii + 220. *Price* 12*s. net.* Cambridge: Cambridge University Press, 1916.

The King's Indian Allies: The Rajas and their India. By ST. NIHAL SINGH. Small royal 8vo. Pp. viii + 308. *Price* 7*s.* 6*d. net.* London: Sampson Low, Marston and Co., Ltd., 1916.

The Slavs of the War Zone. By the Right Hon. W. F. BAILEY, C.B. Small royal 8vo. Pp. xii + 266. *Price* 10*s.* 6*d. net.* London: Chapman and Hall, Ltd., 1916.

The Military Map Elements of Modern Topography. (French School of War.) Demy 8vo. Pp. vi + 130. *Price* 2*s.* 6*d. net.* London: Macmillan and Co., Ltd., 1916.

Through Russian Central Asia. By STEPHEN GRAHAM. Medium 8vo. Pp. xii + 280. *Price* 16*s. net.* London: Cassell and Co., Ltd., 1916.

Travels in the Middle East: Being Impressions by the Way in Turkish Arabia, Syria, and Persia. By Captain T. C. FOWLE, 40th Pathans. Large post 8vo. Pp. xv + 277. *Price* 7*s.* 6*d. net.* London: Smith, Elder and Co., 1916.

Glimpses of our National Parks. Pp. 37. Washington, 1916.

Features of the Flora of Mount Rainier National Park. Pp. 50. Washington, 1916.

Forests of Mount Rainier National Park. Pp. 33. Washington, 1916.

Forests of Yosemite, Sequoia, and General Grant National Parks. Pp. 39. Washington, 1916.

Report on the Administration of the Punjab and its Dependencies for 1914-15. Lahore, 1916.

District Gazetteers of the United Provinces of Agra and Oudh. 5 vols. Allahabad, 1916.

Bengal District Gazetteers. 5 vols. Allahabad, 1915.

Burma Gazetteers. 2 vols. Rangoon, 1916.

Assam District Gazetteers. 6 vols. Shillong, 1915.

Madras District Gazetteers. 24 vols. Madras, 1915.

Publishers forwarding books for review will greatly oblige by marking the price *in clear figures, especially in the case of foreign books.*

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

NEWFOUNDLAND AND ITS FOREST RESOURCES.[1]

By Sir Daniel Morris, K.C.M.G., M.A., D.C.L., D.Sc., F.L.S.

Two years ago the Prime Minister of Newfoundland, when on a visit to this country, said: "Even to-day Newfoundland is not in the public eye, and it is only occasionally that attention is drawn to its valuable resources and its great possibilities in the future." Very few people probably know that Newfoundland is 11,000 square miles larger than Ireland, only one fifth smaller than Great Britain, three times the size of Holland, twice as large as Denmark, equal in size to three maritime provinces of Canada and about the size of the State of New York. "In addition to its great cod fisheries, the largest in the world, and its rich minerals, it has forests of spruce and other timber now producing the pulp and paper upon which many of the London and some of the New York papers are being printed, and over three million acres of good agricultural land as yet practically untouched."

Perhaps one of the paradoxes of the war was that Newfoundland at the end of 1915 found itself more prosperous than ever in her history, despite the unfavourable circumstances that had operated just before the war and during the first few months of its progress. The fisheries were successful, and prices rose to almost double what they were in 1914. An estimate given in the *Times* mentioned that in the 1915 season's codding operations Newfoundland realised two million dollars more than in 1914. Further, operations connected with iron mining were greatly increased owing to the demand for iron and steel for munition-making in Canada. Similarly pulp and paper companies which had had to face

[1] Reproduced by permission from the *Journal* of the Royal Society of Arts for April 28, in slightly abbreviated form.

adverse conditions at the outset of the war "have been operating in full blast." In addition, as will be shown later, a new industry has grown up in Newfoundland in 1915 for the production of pit wood for colliery purposes, owing to the blockade of the Baltic and the inability to obtain supplies as formerly from Russia and Sweden. It is satisfactory to learn that this condition of affairs has been brought about although the Colony has 3200 men engaged in the war—serving in the Naval Reserve and in the Newfoundland Regiment.

As regards accessibility Newfoundland is well placed. From this country a man leaves Liverpool on Saturday by the Allan or Furness Line and arrives at St. John's, the capital, on the following Saturday. From New York he can travel in a Pullman sleeping-car, and in forty-eight hours he can be at a salmon pool in Codroy Valley and find splendid sport. Yachting and scenery are unequalled in any other part of the world.

Newfoundland offers special attractions to tourists and health seekers, and it is claimed to be a paradise for sportsmen. Of the large game the caribou stands foremost; but there are also bears, wolves, and lynxes: fur-bearing animals such as foxes, otters, marten, minks, musk-rats, and rabbits. Of birds there are willow grouse, partridge, Canadian goose, many varieties of duck, snipe, woodcock, and plover. For the rod there is salmon and trout fishing. The writings of Selous, Hesketh Pritchard, J. G. Millais, Dugmore and Admiral Kennedy all bear ample testimony to the excellent sport and splendid scenery of Newfoundland.

Mr. Alexander Murray, C.M.G., for sixteen years Geologist to the Government, writes: "The climate of Newfoundland is, as compared with the neighbouring continent, a moderately temperate one. The heat is far less intense, on an average, during the summer than in any part of Canada, and the extreme cold of winter is much less severe. The thermometer rarely indicates higher than 70° F. in the former, or much below zero in the latter. The climate is undoubtedly a very healthy one, and the general physique of the natives, who are a powerfully built, robust, and hardy race, is a good example of its influence."

The island is occupied entirely by a white English-speaking element, of which 97·5 per cent. is native-born. There are no aborigines. The people, numbering 243,000, are law-abiding, industrious, and temperate.

A useful summary of information respecting the forest resources of Newfoundland is contained in *Newfoundland in 1911*, by Mr. P. T. T. M'Garth, with a Foreword by the Premier, the Right Hon. Sir Edward Morris. Possibly a still more comprehensive store of facts and figures is contained in the Report of the Dominions Royal Commission, especially the Minutes of Evidence taken in Newfoundland in 1914, presented to Parliament in May 1915 (Cd. 7898).

Physical Features.—The island is irregular in shape, with the general outline of a triangle. Its greatest length is over 300 miles, and its total area 16,000 square miles. Its triangular extremities are Cape Norman on the north, marking the entrance to Belle Isle Strait, Cape Race on the south-east, one of the world's greatest seaboard outposts, and Cape Ray at its south-west, the chief landmark of the Gulf of

Lawrence route. All along the coast are innumerable bays and harbours.

Perhaps the most striking physical features of the coast are the several peninsulas which jut out from the main structure. There is the Avalon peninsula on the eastern coast, which is almost another island—the isthmus between Trinity and Placentia Bays being only three miles wide; and there is Burin peninsula between Placentia and Fortune Bays. On the west coast there is Port-au-Port peninsula with the great northern peninsula, formerly called by the French the Petit Nord, and more recently known as the St. Barbe peninsula. The general surface of Newfoundland is hilly, but no marked elevations are reached. The mountain ranges extend north and south; the principal is the Long Range Mountain, which begins at Cape Ray and continues north-east for 200 miles. Its highest peak is 2000 ft. There are several lesser ranges with peaks from 1000 ft. to 1730 ft.

The geology of the island presents numerous points of interest. The rocks range from the Laurentian to the Carboniferous, and are those in which most of the world's metallic wealth occurs.

Newfoundland has an immense number of inlets along the coast. As a result, no portion of the island is more than sixty miles from the sea. There are also numerous rivers. The longest is the Exploits River—200 miles long—which drains an area of 4000 square miles, and is navigable for thirty miles: the Gander, 100 miles long, and its tributaries drain a similar area. Both flow in a northerly direction. The Gambo and Terra Nova flow in an easterly direction into Bonavista Bay. On the west the principal river is the Humber, 80 miles long. This passes through a picturesque and well-wooded country. Along the south coast the rivers are smaller owing to the configuration of the country, but they are numerous and easily accessible. In addition, there are large inland bodies of water, such as the Grand Lake, covering 200 square miles; the Red Indian Lake, 67 square miles; the Deer Lake, Gander, Gambo, Terra Nova, and George IV. lakes. Further, there are dispersed all over the country lesser bodies of water locally termed "ponds."

Water Power.—As may be gathered from the above, Newfoundland is singularly well supplied with facilities for coasting and river traffic, and is a remarkably well-watered country. Water power is available in numerous localities, and the Government offers leases on favourable terms.

"Leases are granted by Government for terms of years of the right to use the waters of any river for driving machinery, subject to such rent and conditions as the Crown may prescribe, and to the preservation of the vested rights of all persons holding lands whose interests may be affected by the use of such water, with a fine of $100 per each offence for introducing sawdust or other deleterious matter into such water." The Royal Commission sums up the situation by stating that "Newfoundland shares with Canada the advantage of great potential water power."

Trade.—As regards trade it is sometimes said that Newfoundland

exports all that it produces, and imports all that it consumes, but according to the report of the Royal Commission this statement, like many other generalisations, does not stand the test of statistical examination. The total external trade per head of population is £25, 5s. as compared with £29, 7s. for Canada, and £9, 9s. for the United States, so that the external trade of Newfoundland per head is nearly as great as that of Canada, and three times that of the United States.

It is probable that the main lines of development in Newfoundland will continue to be associated with the three principal industries that have already chiefly received attention—viz., the fisheries, the mines, and the forests.

In regard to the fisheries, these have generally contributed nearly 80 per cent. of the total exports. The cod fisheries of Newfoundland are the largest in the world. A million and a half hundredweight of dried codfish is exported in addition to large quantities of herrings and lobsters, cod oil, seal oil, seal skins, and whale oil.

The mineral wealth is regarded as very considerable. The deposits of hematite iron at Bell Island are reported by the Royal Commission to be "remarkable." It is said there is nothing at all comparable to them in any of the other Dominions "except, perhaps, those at Iron Knob and Iron Monarch in South Australia." Further, it is possible they may become of "immense potential importance to the iron and steel industries of the Mother Country as well as those of Canada."

For transport purposes, in addition to the facilities afforded by the numerous inlets, rivers, and lakes, there are railways with a total mileage of 800 miles. Associated with these is a flotilla of eight steamers. By means of the agency of the railroad and the coasting steamers, it is claimed that the trading conditions of the island are being steadily extended and improved.

Forest Areas.—The timbered areas are generally found in the valleys of the larger rivers and their tributaries, and on the banks of the lakes and ponds, confined, in many cases, to strips from one to two miles wide. It is estimated that there are altogether about 10,000 square miles (6,500,000 acres) of wooded lands in the Colony. The best timbered areas on the rivers and water-courses draining the east coast are on the Gander River, Dog Bay Waters, Indian Arm, Exploits River and its lakes and tributaries, the Halls Bay Waters and the rivers flowing into the south side of White Bay and into Baie Verte. Those on the west coast are associated with the Grand Lake Waters, Deer Lake, Humber River, and others flowing into Bay of St. George and into Bay St. John, Bonne Bay, and Hawke's Bay. On the south coast there are many areas of timbered country at the bottom of the bays and along the lower reaches of the rivers. In some sections very considerable areas of large timber and large quantities of trees suitable for pulp wood still remain.

All the known timbered areas in Newfoundland, except those lying within the three-mile limit of the shore reserved by the Government, are held under licence by private parties or by companies. The conditions under which these licences are issued give the holder the right to cut timber on lands described therein for a term of ninety-nine

years on the payment of an annual rental at the rate of $2 per square mile.

In the case of lumber there is a royalty payable on all timber cut on the area except such timber as is manufactured into pulp and paper, which is not subject to a royalty.

In the production of sawn or manufactured lumber there are a dozen large mills in operation under licence, and 120 small mills which produce cooperage stock, barrels, shingles, and laths. The annual value of the output of these is estimated at £120,000. In 1906-7 the value of the exports of sawn lumber reached a total of £65,000; but in later years the value has fallen to less than £1200. One explanation of this is the increased quantity of lumber absorbed by local requirements. In spite of this, a considerable quantity of hard pine and other woods, not obtainable in the Colony, for inside parts of buildings, furniture, and carriage building, is imported. The value of these in 1912-13 amounted to £21,000.

Of the spruce lumber, which is of exceptional quality, Mr. Turner, Deputy Minister of Agriculture, reports that it is used locally for general building purposes, and for ship and boat building, or, in the case of the smaller fir and spruce, is manufactured into pulp. A very small proportion of the birch timber is utilised: the principal uses at present are for the construction of the under-water parts of the hulls of schooners and for wharf piles, as the wood is found to last better than most for these purposes; it is also used for sheaves for rollers, for carrying haulage cables at the Bell Island Iron Mines, for spools for paper, and laths for binding pulp for export at Grand and Bishop's Falls, and some for car building and furniture. One mill at Bay d'Espoir uses a large proportion of its cut of birch as well as spruce and fir for the manufacture of furniture, while the factories in St. John's use a considerable quantity for this purpose. Tamarack and juniper are used for schooner construction and for flooring in buildings. In addition to the timber manufactured, as before mentioned, a very large quantity is cut annually and used for firewood, fencing, poles for erecting fish flakes, spars for boats and vessels, telegraph poles, railway ties, pit props, wharf piles, etc. As no return of the timber used for these purposes is made it is not possible to give the quantity, but, according to Mr. Turner, it is probably as great or greater than the quantity used in the mills.

Labrador.—The peninsula of Labrador, with its 600 miles of coast and 120,000 square miles of territory, is a dependency of Newfoundland. The boundary between Labrador and Canada is a line running due north and south from Blanc Sablon in the Strait of Belle Isle to latitude 52° N. Newfoundland, therefore, owns the outlets to the Atlantic of all the large areas drained by Sandwich Bay and Hamilton Inlet, and the lesser fiords that indent the coast.

Recent explorations by competent observers, and the writings of Dr. W. T. Grenfell and others, show that much of Labrador is not a country of "awful desolation," but in many parts is well wooded, and contains latent resources of value in forests, fisheries and minerals. The timber trees, very similar to those of Newfoundland, consist of white and black

spruce, balsam fir, and larch, the Jack or Banksian pine, cedar, white birch, poplar, and aspen. The forest areas are reported to be almost continuous over the southern portions to 53° N.

It is generally recognised in Newfoundland that Labrador may eventually become the centre of a large wood-pulp industry. In the meantime it might supply pulp wood to some of the mills operating in Newfoundland.

Timber Trees.—The pine or white pine of Newfoundland (*Pinus strobus*) is known in England as the Weymouth pine, as it was introduced in 1705 by Lord Weymouth. It is a fairly common ornamental tree in parks and gardens in this country. On account of the value of its timber, for a century or more it has played a conspicuous part in the material development of the United States and Canada. It is the most generally useful of all the pines. As the supply is falling off, prices for white and yellow pine of good quality have risen considerably in recent years. In Newfoundland it is stated that "in some sections, notably on the Gambo, Gander, and Exploits Rivers, and at Dog Bay, good pine is still to be found." In other districts the trees are more scattered. The sawn lumber produced from the white pine, with some spruce, is estimated to reach an annual value of £200,000. Most of it is devoted to local purposes. It has been very little exported in recent years. *Pinus strobus* is not used for pulp purposes. The red pine (*Pinus resinosa*), which somewhat resembles the Corsican pine in this country, grows fairly plentifully in Newfoundland, and is largely used in the construction of vehicles and for household furniture. On account of the resinous character of the timber, it furnishes an excellent material for railway ties.

The black spruce (*Picea nigra*) is widely distributed in Eastern America and Canada, and forms an appreciable proportion of the timber trees of Newfoundland and Labrador. The superintendent of the Grand Falls Mills, in a memorandum prepared for the Dominions Royal Commission, speaks of the black spruce as affording "the best material for pulp-making there is." This is supported by Mr. Ruben F. Horwood, managing director of the Horwood Lumber Company and of the pulp mills at Campbellton, who says: "Newfoundland spruce makes wood pulp equal to the best, and superior to most on the market, and it bears a high reputation."

The balsam fir (*Abies balsamea*) derives its name from the transparent balsamic resin yielded by it. This is known as Balm of Gilead and Canadian balsam. The tree is very abundant in the central and northern districts of Newfoundland. At the Grand Falls Mills it is stated that possibly more than one-half of the pulp wood used there is balsam fir. There is no record of the proportion used at the Bishop's Falls and the Campbellton Mills. The balsam fir was for a long time considered by American and Canadian mill-managers to be of little value for pulp-making. It is only within the last ten years it has been so largely used.

The white spruce (*Picea alba*), although fairly abundant in Newfoundland, is not specifically mentioned as being utilised for pulp purposes. It is easily distinguished from other spruces by its bluish,

disagreeably-smelling leaves. It is said that in northern Quebec only the tops of the white spruce are converted into pulp, the trunk being used for sawn lumber and for railway ties, piles and telegraph posts. The American larch, commonly known as the tamarack (*Larix americana*), thrives in certain areas in Newfoundland. Tamarack and juniper are reported to be used for schooner construction and for flooring buildings. The tree vegetation of Newfoundland, in addition to the above, includes a large number of broad-leaved trees, some of which may also be utilised for making wood pulp. Among birches the canoe or white or paper birch (*Betula papyrifera*) grows to a good height. The wood is light, strong, tough and close-grained. The heart wood is tinged with red. The yellow birch (*B. lutea*) is another strong-growing tree, with close-grained, satiny timber largely used in the manufacture of furniture. The cherry birch (*B. lenta*), also known as the black, sweet, and mahogany birch, produces a heavy, very strong and hard wood extensively used in the manufacture of furniture. With regard to a wider utilisation of birch timber in Newfoundland, the Deputy Minister of Agriculture suggests the establishment of "factories for making such articles as flooring, bobbin stock, bobbins, spools, shoe shanks, staves, veneer, dowels, chairs and furniture stock, piano backs and other articles, into all of which this wood is manufactured in other countries." "Such factories," he says, "would not require very large powers to operate, and there are many localities in which water power might be developed, which, while not sufficient for the operation of large plants, such as those required in paper and pulp factories, would be sufficient for the running of the machines used for making these articles."

The sugar maple (*Acer saccharum*) is found in southern Newfoundland. In addition to the sugar produced from the sap, it is of great economic importance on account of its splendid timber, which is strong, close-grained, and polishes well. Timber with curled and contorted grain is known as "Bird's-eye" maple, and is used for cabinet work.

The black ash (*Fraxinus sambucifolia*) grows to a large size in swamps and along the banks of rivers in southern Newfoundland; the rather coarse-grained wood is durable, and is used for a variety of purposes.

The American elm (*Ulmus americana*) is also present as a large tree in Newfoundland. It yields a heavy tough timber, which is used for wheel sticks, in cooperage and boat and ship building. The balsam poplar, or tacmahac, and the aspen or quaking poplar yield light timber, which may be used to some extent for wood-pulp purposes, as in Canada.

According to Mr. S. Charles Phillips, in the manufacture of paper pulp, Canada, in 1914, used 1,224,376 cords of wood. Of this 68 per cent. was spruce, 25 per cent. balsam fir, 3 per cent. hemlock, and nearly 2 per cent. Jack pine (*P. Banksiana*), the balance being poplar.

Wood Pulp.—The utilisation of vegetable fibres in textile industries and in paper is based on the fibrous forms of the naturally-occurring cellulose, which must possess such structural qualities as strength, elasticity and specific gravity. In addition, they must possess the power of resistance to chemical changes to enable them to withstand

wear and tear. Staple textiles of this group are cotton, flax, hemp and jute. Other fibres of a coarser character are used in rope-making and brush making industries. During the latter part of the nineteenth century the progress made in the use of various forms of cellulose has been almost phenomenal. Taking one industry, that of paper, which formerly was almost entirely made from rags, either linen or cotton, owing to the insufficient supply of rags and the consequent rise in price, other fibres began to be adopted as substitutes. Mainly through the persevering efforts of Mr. Thomas Routledge in the seventies, esparto grass from North Africa was utilised for paper-making, and the success of this is shown by an annual consumption of something like 250,000 tons. Most kinds of straw are also capable of being used for paper-making. It closely resembles esparto, and is reduced to pulp by a somewhat similar process. During the period from 1870 to 1880 a still greater advance was made, as it was demonstrated that cellulose well adapted for paper-making could be obtained from the timber of coniferous trees. These trees, as is well known, are widely distributed all over the world. The development in this direction has been so great that wood pulp now furnishes the main source of supply for paper-making. In 1912 the total value of raw materials imported into this country for paper-making was £5,800,000; of this wood pulps represented 70 or 80 per cent.

Mr. Cross, in a recent article in *Nature*, states that wood pulps are so largely adopted for paper-making, not only on account of their quality or merits as cellulose, but being obtained from a massive material they are capable of being produced in a state of exceptional cleanliness and by economical processes. Moreover, as the paper-maker found himself provided with a "half stuff" clean, cheap, and presumably unlimited in quantities, its production displaced the chemical pulping of such raw material as esparto and straw. There is one drawback, but that is inevitable at present—viz., the dependence of the English paper-mills upon foreign supplies. To some extent this can be obviated by tapping the enormous resources of Canada and Newfoundland. Canada is credited with forest areas of 800 million acres, and, under a system of organised forestry, it should eventually be capable of largely meeting the requirements of this country. At present Canada is the second largest producer of wood pulp, the first being the United States of America. As is here shown, Newfoundland, and Labrador also, are likely to provide an appreciable supply, provided their resources are carefully guarded and fully utilised.

Paper and Pulp Mills.—The most important and far-reaching event that has occurred in Newfoundland in recent years has been the establishment of a pulp and paper industry by the Anglo-Newfoundland Development Company, followed soon afterwards by the Albert Reed Company, of London. The Anglo-Newfoundland Development Company, which is known locally as the "A.N.D. Company," determined in 1905 to locate its mills in Newfoundland, after spending three years in seeking an adequate supply of pulp wood and a suitable site elsewhere. Exhaustive tests of woods in Canada, Sweden, Norway, and other

countries where forest growths suitable for the manufacture of pulp and paper are found, were made. The conclusion was reached that Newfoundland was most worthy of consideration, and a self-contained forest area of 3,400 square miles in the centre of the island was secured. This is nearly twice as large as the whole of Prince Edward Island. From the Grand Falls on the Exploits River the company secured the necessary power, with communication from the mills to tide-water at Botwood.

The company gave the following as the reasons that weighed with them in making their decision: That timber is cheap and of excellent fibre; that labour is plentiful, and, compared with the United States and Canada, moderate in price; that the cost of logging is low because of the dense growth of the wood and the general topography of the country, water being abundant and the whole terrain such that the logs can be got to the rivers for driving with a minimum of cost and labour.

The logging operations carried on by the A.N.D. Company are necessarily on a large scale. The felling takes place in winter, when the fishermen find congenial and useful employment on land. The size of the trees used for pulp wood must not be less than four inches across at the small end. The total yield from each winter cut is about 60 millions superficial feet of timber, equivalent to 120,000 cords of pulp wood. A cord is a cubical measure (4 ft. × 4 ft. × 8 ft.) containing 128 cubic feet: according to the time at which it is cut the weight may vary from two to two and a half tons. Usually a ton weight of dry pulp is obtained from each cord.

Grand Falls Mills.—These fine mills, owned by the Anglo-Newfoundland Development Company, were completed in the autumn of 1909, when the first paper was made in the Christmas week of that year. The mills at the time of their completion were the largest in the world, and represented the most perfect assemblage of paper-making plant and equipment that engineering skill and experience, backed by ample capital, could provide. They now supply the requirements of four British newspapers.

The raw material, that is the pulp wood, is obtained from forest areas held by the company aggregating 3400 square miles. These areas are on the banks of the Exploits River and its tributaries, reaching in a south-westerly direction as far as King George IV. Lake. They extend to the north-east to the coast in the Red Indian Lake country. In the logging operations a force of 1500 men is employed. These are located in eighty camps. In spite of the enormous yearly consumption of pulp wood the company is satisfied that it possesses "more than an ample supply" for the needs of the present mills.

The whole of the power operating these mills is derived from the Grand Falls. The total height of these from the top of the dam, at the head of the rapids, to the bottom of the power-house, is about 120 ft. There is a direct head of water of 113 ft.

The pulp produced is of two qualities—mechanical pulp and sulphite pulp. The former is produced by forcing the wood logs, after they are

cut into short lengths and barked, by hydraulic pressure against the face of a rapidly revolving grindstone, continually flooded with water. The fibres of the wood are torn away by the friction of the stone, and the constant stream of water carries the pulp into a pit below. When fully sieved and screened the pulp is distributed either to the paper-machines for making into newspaper, or to the hydraulic presses which squeeze out the water, leaving sheets of pulp with 40 per cent. moisture, in which state it is packed in bales for export.

In the case of sulphite pulp, the prepared logs are chipped by a powerful machine into small pieces or flakes about an inch square and one quarter of an inch thick. These chips are next thoroughly "digested" with a chemical solution (bisulphite of lime) at a high temperature.[1] By this means the chips are gradually reduced to a soft pulpy mass. The latter is thoroughly washed with clean water and finally sent to the paper-mill. The combination of the two stocks—mechanical and chemical pulp—are put together by the paper-mill and result in the finished product of newspaper.

The completed paper is conveyed by the company's own railroad to its shipping port at Botwood, and there shipped on chartered steamers to England. The average amount paid in wages and salaries by the company in Newfoundland varies from £175,000 to £180,000 per annum. It speaks well for the adaptability of the Newfoundland people, for the most part fisher-folk, that at the Grand Falls Mills only 1 per cent. of the work-people are from outside the Colony.

In the neighbourhood of the Grand Falls Mills, following the example of the best traditions of British commercial enterprise, the A.N.D. Company has established a town of 2500 inhabitants. This contains well-built houses and bungalows, a hospital, a good club, bathrooms, a large school, a town hall which is the centre of all public amusements, and spacious athletic grounds. Outside capital has established itself in stores which supply all requirements. At a distance of three miles a farm supplies the town with milk and vegetables. The head-quarters of the logging operations are at Miller Town, a settlement of about one hundred houses with a church, school, hospital and stores complete.

Bishop Falls Mills.—These mills were completed and commenced operations in April 1911. The area of timber licences held by the company is 820 square miles, situated mostly in the Exploits watershed east of Grand Falls. The water power derived from the Bishop's Falls has a capacity of 14,000 h.p. Most of the production is shipped to England. The number of mill hands is 200, with 150 employed in the woods in winter. The resources of the company in Newfoundland are stated to be ample for all its requirements.

At Campbellton (Indian Arm), in Notre Dame Bay, the Horwood Lumber Company has a pulp-mill, and others are in contemplation.

It has been pointed out by Mr. S. Charles Philips, that in 1913, a normal pre-war period, Newfoundland supplied this country with news-

[1] The lime for the manufacture of sulphite pulp is obtained locally, and is said to be quite pure and suitable for the purpose.

paper (on reels) to the extent of 17·4 per cent. of the total imports. On the other hand, in 1915, a full year of war, paper on reels showed a total decrease of nearly 30,000 tons—the total imported being 106,720 tons. Of this quantity Newfoundland contributed 44·7 per cent. Thus, for the first time in the history of the paper trade, Newfoundland took a premier position as an exporter to this country of paper on reels—the total amount being 47,789 tons, or 15,110 tons in excess of that supplied by Norway.

The following figures show the export of paper and of pulp since the industry first began :—

Year.	Paper.		Pulp.	
	Tons.	Value.	Tons.	Value.
		£		£
1910.	7,900	73,000	6,900	14,000
1911.	21,100	197,000	27,200	52,000
1912.	26,800	250,000	42,100	75,000
1913.	44,400	415,000	57,500	91,000
1914	40,077	374,000	51,605	77,645

Pit Timber.—In addition to the production of paper and pulp and certain descriptions of lumber, Newfoundland affords an excellent field of operations for pit timber.

The total annual consumption of pit wood, or pit props, for the coal mines of the United Kingdom is estimated at 4½ million tons, of the value of £5,000,000. The chief supply in the year 1913 was obtained from Russia, France, Sweden, Portugal, and Norway. On the outbreak of the European war it became evident that the supplies of pit wood would be largely curtailed, and the Board of Trade took steps to ascertain how far other existing sources of supply would meet requirements. Among the new sources from which pit wood could be obtained was Newfoundland, and a Commission of Inquiry was dispatched there, and a report was presented in December 1914 (Cd. 7728). It was stated that very large areas of suitable timber exist in the island, a considerable proportion being close to the seashore or to many bays and rivers, and therefore easily transported to the various points where it could be loaded on to steamers. The suitable timber consists of fir and spruce, the former being a more quickly-grown timber than the latter. Within three miles of the shore over the whole island the timber rights are reserved by the Government. Ordinarily any one may cut timber on this three-mile limit for firewood, house-building, boat-making, and other purposes, but not for export, except in the form of pulp. By a special Act since the outbreak of the war the Government have sanctioned the export of pit wood, and this concession is still in force, and probably may be continued until the end of the war. The conclusion arrived at by the

Commission of Inquiry was that Newfoundland could apparently be equal to an annual output of 300,000 cords of pit wood, and that it could meet nearly half the shortage from the Baltic occasioned by the war. After some trial shipments had been made, and the pit wood was found to meet fully the requirements of the collieries, a considerable trade has been established between Newfoundland and the United Kingdom. Last year thirty-three cargoes were shipped, and others are likely to follow during the coming summer. If pit wood is supplied at an average price of about $5 per cord, and say one-half of the annual quantity mentioned above is shipped, this would mean that an additional £100,000 would be circulated in wages amongst the working people of Newfoundland.

Re-afforestation.—This is a subject that intimately concerns the success of the wood-pulp industry in Newfoundland. It has already received some attention. Mr. Reuben F. Horwood stated that the rapid growth of the trees is an item of great value in the reproduction of the Newfoundland forests. Along some of the watercourses and on the lowlands near the river outlets the forests would produce a new growth in fifteen years. On an average over the island he thought that the new growth might take thirty to fifty years. Where the larger trees were cut out the smaller trees that were left grew more rapidly, and under such conditions a rotation of twenty to thirty years might be possible. Mr. Vincent Jones was of opinion that, "with judicious and scientific safeguards," the forests might be rendered capable of indefinite reproduction. The uniformly moist climate of Newfoundland is very favourable to the rapid growth of trees.

The Royal Commission recommended that, in order that the forests of Newfoundland should be a permanent asset, it was necessary to lay down scientific regulations as to the conditions on which cutting should be permitted. It added, "whilst the larger operators may no doubt lay down certain rules to suit their own convenience, experience elsewhere shows that Government control on such a question was essential. We venture to suggest that the Newfoundland Government should devote its early attention to this question."

Forest Fires.—As in Canada and elsewhere, it was becoming a matter of serious concern to guard against forest fires. The evidence given before the Royal Commission in Newfoundland indicated the gravity of the situation. Mr. Horwood stated, "during the past twenty years the average loss to the country from forest fires would be from £1,000,000 to £2,000,000 annually. In his opinion, "before any reforms in cutting or re-afforestation methods are considered, this criminal waste of public wealth should be dealt with, for it constitutes the most serious problem in conservation that Newfoundland had to consider." The forest fires in Newfoundland are said to be caused in large proportion by railway trains; also by sportsmen, and to some extent by careless woodmen. The Deputy Minister of Agriculture reported that, "unfortunately in the past large sections of the best timbered country have been burnt over by forest fires, but of late years the organisation of a forest fire patrol by the Government, with the assistance of the operating lumber companies, has considerably lessened the danger of loss from this cause."

Steamship Communication and Cables.—The Royal Commission reported that the coastal services and direct services with Canada and the United States leave little to be desired. There is a daily service across the Cabot Strait with Nova Scotia, and a regular weekly service with Halifax and New York. The means of direct communication with the Mother Country are not so satisfactory. Although there is a subsidised steamer service costing the Colonial and Imperial Governments £4000 per annum, the Royal Commission reports that the most modern and fastest boat running between the United Kingdom and Newfoundland is the property of an unsubsidised company. It adds, "We entirely agree with the views expressed by the Prime Minister of Newfoundland at the Imperial Conference in 1911 as to the need for a faster and better service, and we cannot recommend the continuance of the present state of affairs."

Newfoundland is exceptionally favoured as regard cable services, and therefore in a position to assist in promoting Imperial trade. Nine Atlantic cables are landed near St. John's, and are laid thence to New York and Canada. One cable, which is entirely under the control of the Newfoundland Government, connects St. John's and Nova Scotia and other parts of Canada.

In addition to the cable services, a through wireless service from the United Kingdom to Newfoundland is now in operation.

Appendix.—The following information, communicated as the result of comparatively recent observation in Newfoundland, by Mr. Richard W. Wilson, M.I.Mech.E., will be read with interest :—

"I travelled inland from the coast on the east, west, and south side of the island, and although the higher elevations as well as the coastline were barren, the inland valleys were well wooded.

"At the sides of the rivers and lakes I saw large tracts of spruce and fir, and also some pine and birch. Most of this timber was straight and sound, and admirably adapted for the manufacture of pulp : but there was a fair proportion of trees also large enough for the manufacture of good lumber. The tallest trees reached a height of quite 70 feet, many of them being over 20 inches in diameter, and they were so situated as to be easily transported to the tidal waters. Excellent sites for the erection of mills and for the loading of ocean-going ships existed, too, in very many places. Waterfalls for providing power were plentiful also.

"I was told by the inhabitants that re-afforestation of these timber lands where the wood has been cut down takes about forty years : but, even if one adds ten years to that, a very large perpetual supply of wood is obtainable both for lumber and pulp, sufficient to keep at least half-a-dozen pulp-mills going, and lumber-mills besides, working full time.

"Labour is plentiful, for when this is most required in the logging camps the fishing is over : and the Newfoundlander is as handy with his axe as he is with his oar and his tiller. Newfoundland is certain to become a valuable source of pulp and lumber to this country, for there the trees are, and none of the forests are at a great distance from the sea.

"Moreover, Newfoundland is not so much bound up with ice as most other countries are which produce this class of timber. Heavy ice packs, certainly, are driven in on the east and west coasts in the late spring; but the south coast is entirely free from drift ice. The temperature of Newfoundland never reaches the low degrees it does in Canada, and the thaw sets in earlier. Jutting out into the Atlantic to a much greater distance than most people realise, Newfoundland is much nearer the Mother Country for shipment of its produce than most of the countries from which are derived the increasing tonnage of lumber and pulp."

ARABIA AND THE ARABS.

By V. Dingelstedt, Corr. Member of the R.S.G.S.

(*Continued from page* 330.)

El Hejaz.—With a population of three and a half millions, and an area of 96,500 square miles, this province is the Holy Land of the Mussulman world. It contains the famous cities of Mecca and Medina, the goal of pilgrimage of about one hundred thousand pious Moslems yearly who aspire to acquire the honourable title of *Hadji*. Infidels are not allowed to visit these sacred cities, but more than four centuries ago courageous men braved the dangers of the act and left accounts of what they had observed. The first European to visit Mecca was an Italian, Ludovico Bartema; the first Englishman, Joseph Pitts, in 1678. Since, some dozen other travellers in the last century have visited these guarded cities, and one of them, viz. the Dutch scholar, Snouck Hurgronje, resided in Mecca for a long time.[1]

The principal object of adoration in Mecca is a stone, presumably a meteorite. The name Kaâba (Holy House), applied to the building containing the stone, reveals sufficiently its high importance. This stone worship, known to Arabs in ancient times, recalls the legend of the Svanetion Highlanders, which the writer had the occasion to quote in his paper twenty years ago.[2] According to this legend, before the creation of the world, God was confined in a high rock, which He burst at last.

Mecca is situated 65 miles inland from Jeddah or Jiddah, the harbour where Christians are tolerated, in a narrow, barren valley, surrounded by bare hills and sandy plains. It has about twenty-five chief quarters. Its streets are broad, pretty regular, but unpaved, and in consequence dusty in summer and muddy in the rainy season. The houses are high and painted. The mosque surrounding the Kaâba, called the Beit Allah, or House of God, is capable of containing 35,000 persons. No trees, nor verdure of any kind, are to be seen in the city. The townspeople, about 50,000, are generally able to converse in three or four Eastern languages. They are described by some as lively, polished,

[1] Mecca, *Mit Bilder-Atlas*, 2 vols., Hague, 1888.
[2] *S.G.M.*, vol. xi. p. 297.

and frivolous; by others as coarse and proud. According to Burton,[1] the Meccan is a covetous spendthrift. His wealth, lightly won, is lightly prized. They live, as in many other shrine-containing places in our Christian world, on the ignorance and superstitions of pilgrims. The Meccans look upon themselves as the cream of earth's sons, and they resent keenly the least slighting word concerning the Holy City and its denizens. Equally ignorant and conceited, they laugh at modern science and cultivate the superstitious practices of ancient times.

Medina is the second city of the whole of Arabia. "Within the sanctuary or bounds of the city it is affirmed all sins are forbidden." It is called *El Munowara*, the "illuminated," because on approaching the city devout Moslems pretend to see a luminous haze over its mosques. It is the chief stronghold of Hejaz. Its streets are deep and narrow, and only partly paved; it has flat-roofed and two-storied houses built of basaltic scoriæ, burned brick, and palmwood. The town contains the Great Mosque, Mesjid-el-Nebi, supposed to contain the prophet's body. To the Mosque are attached a great number of ecclesiastical officials, Ulemas, Mudarisin, Imaums, Khatibs, etc., eunuchs, sweepers, porters, guides, who live on the pilgrims' alms, backsheesh, and by extortion. The city was once famed for its scholars, and though in its decay now, it is yet busy and agreeable. Burton conceived no good opinion of the people—pride, pugnacity, a peculiar point of honour, and a vindictiveness of wonderful force and patience, are, according to him, the only characteristic traits of Arab character, which the citizens of El Medina habitually display.

Other towns in this province are Jiddah, the harbour of Mecca. Viewed from the sea it has a rather imposing and pretty appearance, the houses being white, three or four stories high, surrounded by a wall. The illusion is, however, dispelled on the approach to land. The streets are narrow and dirty, and sanitary conditions deplorable, so that evil odours abound everywhere. The commercial importance of the harbour has declined greatly since the opening of the Suez Canal. The motley population is not above 20,000. The townspeople live by fleecing pilgrims. They are hotel-keepers, guides, money-changers, money-lenders, slave-dealers, drummers, all at the service of pious hadjies.

Yembo is another port serving Mecca; while Taif, south-east of Mecca, is a pleasant garden-city and a health resort. Rabagh and Kunfunda are two ports on the Red Sea.

Between Hejaz and Yemen is the mountain region of Asir, whose brave highlanders have ever resisted the rule of the Turks, and have always succeeded in maintaining practically independent the region between Taif and Roda, some miles north of Sana.

Hadramaut.—This province, called also the Land of Uz, is the least known part of Arabia, save Nefud, yet as lying next to Aden it has a particular importance for England. It stretches between the great desert and the sea eastward to Oman, the land rising from the coast in a series of terraces to Jebel Hamra. Some tracts of it are under British protectorate. It was described by Abdullah Mansûr,[2] who, to avoid the

[1] *Personal Narrative of a Pilgrimage to El-Medina*. London, 1857.

[2] *S.G.M.*, vol. xxvii., p. 154.

dangers of travel, adopted the disguise of a down-country Arab chief. It is a dangerous country to travel through, and to accomplish the task many rare qualifications are needed. Hadramaut was also partly explored by Von Vrede, Joseph Halévy (1870), Theodore Bent and his wife, and the Dutch Van den Berg. All these explorers have left records.[1]

The chief town is Shibam, while in addition there are the cities of Makalla, Haura, and Shehr. Shibam, the residence of the most powerful Sultan of Hadramaut, is built on rising ground in the centre of the narrowest part of the valley. It offers, according to Mr. Bent, a curious appearance: above its mud-brick walls, with bastions and watch-towers, appear the tall whitewashed houses, which make it look like a large round cake with sugar on it. The city has been celebrated from ancient times. Makalla is the chief commercial port of the region. The most influential inhabitants of the town are Parsees from Bombay, and Hindustani is spoken nearly as much as Arabic. The reigning sultan belongs to the Al Kaiti family. The town is filthy and malodorous. Haura is a village surrounded by palm-groves, and dominated by a castle seven stories high, belonging to the Al Kaiti. Shehr is a coast town. Mr. Bent says that it is a detestable place by the sea, set in a wilderness of sand. The Arabs of Hadramaut have much connection with India and Java—large colonies of Hadramis emigrated to Java more than a century ago. The facts of this near connection of Hadramis with the inhabitants of the Dutch archipelago, and their frequent intermarriages, were first brought to light by Van den Berg.[2]

Oman is a mountainous country, partly very fertile, and about as large as England and Wales together. It has a good harbour at Muscat, and manufactures cotton, silk, and arms. Some of its mountain peaks attain an altitude of 10,000 feet.

This state is a kind of island, for it is separated from the rest of the world on one side by the sea, and on the other by the desert. According to General Haig[3] its people are even more primitive, simple, and unchanged in their habits than the Arabs generally. It is the largest, and in some respects the most interesting, province of Arabia. Turkish rule never extended thus far, and the country finds itself under independent rulers, called Imams or Seyyids. The population, about 1,500,000 strong, is divided into two rival races called by some Hinani and Ghaffiri, and by others Kahtani and Aduani, which are in continuous feud, and inhabit separate quarters in some of the towns. These two stocks are subdivided into two hundred different tribes, and these again into "houses." Each family group has its own sheikh—the eldest male in the family.

The towns are numerous: Muscat, the sole port of access to Oman, Mattra, Sib, Dahirah, Burka, Sur, Sohar, Khorfakan, Nakhl, and others, with from 5000 to 10,000 inhabitants. There are but few nomadic tribes. Muscat and Mattra, only two miles apart, are the chief towns

[1] Van Vrede, *Reise in Hadramaut*; Bent, *South Arabia*, 1899.

[2] *Le Hadramaut et les colonies arabes dans l'Archipel Indien.* Batavia, 1886.

[3] "A Journey through Yemen," *G.J.*, vol. ix No. 8.

on the coast. The heat of these cities is extreme; it is not unusual for a black bulb thermometer to register 189° F. in the sun at Muscat, and 107° at night.

Muscat has two old forts, which stand out on each side of the town, and it is cut off from the plain behind by a strong wall, which stretches from hill to hill. The wall is pierced by two guarded gates, closed a couple of hours after sunset. Beyond the walls are houses and mat huts inhabited mainly by Baluchis and Negroes. The population of Muscat, a port of transit, is most heterogeneous—Arabs, Baluchis, Banians, Negroes, Persians jostle one another. The trade is mostly with India; the chief exports are dates, fruit, shark fins, fish, and salt: the imports rice, sugar, coffee, silk, petroleum, piece-goods, and arms.[1]

About 25 miles from Muscat, at Sib, begins the fertile Batina coast of the Gulf of Oman; it extends for 150 miles up to the mountainous cape of Musendum in the neighbourhood of Khor-Kalba, and has an average width of about 12 miles. It is studded with many towns and villages—chiefly built of mat huts, among date-groves and gardens—Sib, Burka, Suaik, Sohar, Shinas, Dibba.

South-east of Muscat, towards Ras-el-Had, there are on the coast some small villages, and the large double town Sur, situated on a back-water, with two forts. It has about 8000 inhabitants, belonging to the two clans of the Bui Bu Ali and the Bui Janaba, often in feud one with another. The people are bold sailors, enterprising merchants, but also slave-dealers.

The coast beyond Ras-el-Had is inhabited by two large Arab tribes, the Mahrah and the Gharah: the first, descended from the ancient Himyarites, occupy a coastline of nearly 140 miles from Saihut to Ras Morbat: their chief town is Damkut. They are smaller than most Arabs, not at all fair, very poor, and utterly ignorant: they have a soft and sweet language, and a peculiar mode of salutation, consisting in putting their noses side by side and breathing softly.

The Gharah inhabit the mountainous coast between the islands Moseirah and the Kuria Muria: they are troglodytes, largely nomadic, and shift from cave to cave. Their wardrobe consists of a single piece of coarse blue cotton wrapped around the loins. The women wear a loose frock of the same texture and colour, reaching a little below the knees in front, and trailing on the ground behind. Children go naked. Both men and women tattoo their cheeks. They are armed with swords, spears, daggers, and matchlocks. Their diet consists of honey, milk, flesh, and fruits. The main products of this region are frankincense and the celebrated wild honey collected from rocks. The trade in incense, so largely used by all nations of antiquity, was formerly highly important.

In the heart of Jebel Akhdar is hidden the fort of Nakhl: it has renowned thermal springs. It contains about 6000 inhabitants, among whom are 1500 Arabs, mixed with Persians, Negroes, Zattut, and Bayasir. The last, an industrious and peaceable people, are regarded as aliens by the Arabs and despised by them.

[1] Zwemer, *Arabia*, p. 82.

The windows in Nakhl are never glazed: they are closed at night with wooden shutters. Circular holes at the top of the room serve for ventilation. The teak beams and rafters are often carved or painted.

In the same mountains are also situated the towns of Sheraizi and Zikki. The last contains 8000 inhabitants, composed of the two hostile tribes, Yemen and Nizâr. Sheraizi is perched at the head of a ravine like an eagle's nest. In northern Oman, along the Persian Gulf, extends the Pirate coast explored by the Rev. Mr. Zwemer in 1900-1.[1] From the abundance of fish this coast was once called Ichthyophagi. Along it are situated the towns—Deboi, the well-built and growing metropolis of northern Oman, with some 15,000 inhabitants; Abu Thabi with 10,000 Arabs, Negroes, and some Banians; Ras-el-Kheima, with a number of well-built houses and a businesslike aspect; Sharka, a famous Wahabi centre, now in decline.

El Haza.—The province of El Haza makes a triangle on the Persian Gulf beyond Bahrein, between Bui Hajar on the north, the peninsula of El Katar, and the desert on the west. Bahrein is the most eastern part of Arabia. El Haza is a low country, as its name signifies. It is rich in underground watercourses.

The main cities of El Haza are El Hofhuf, the capital, and El Katig. The first is surrounded by gardens and a mud wall: inside it are also some gardens, in which grow in abundance the date-palm, the nabak, the papaw, the fig, and the pomegranate. Indigo and cotton, rice and sugar-cane, as well as different vegetables, are also cultivated. El Haza is celebrated for the manufacture of *abbas*, a kind of cloak with rich embroidery, and brass coffee-pots of curious shape and pretty form. Once rich and prosperous, the Hassa's capital under Turkish rule is now in decline. El Haza constitutes a part of the Basra vilayet.

The Irak Arabi is the north-eastern, and richest, province of Arabia, covering the great alluvial plains of the Tigris and Euphrates. It is the ancient Mesopotamia, called by the Arabs El-Jesireh, the seat of vast ruins of once great empires. From the neglect of irrigation, misrule, wars and oppression, the once very rich country has been partly laid waste, but in the last 75 years, thanks to British enterprise, it has already been considerably developed. Mesopotamia, with the exception of Jebel Sinom, forms a flat, almost level, stretch of meadow without any rise or fall, save the artificial ancient mounds. On both sides of the wide river, on the whole length of the country from Fao and Mohommerah to the Montefik Arabs above Kurna, there are endless plantations of date-palms. This tree attains here its greatest perfection of beauty and utility. According to the statement of an English merchant at Basra, the entire annual date-harvest of the river country might conservatively be put at 150,000 tons. The palm-tree has a thousand different uses.

The principal towns of this province are the following: Baghdad, by far the most important town, founded about 765 A.D., was the capital of the Moslem world for five centuries. It is in decay now, and preserves only some ruins of its former glory. Thanks to its situation on the

[1] *G.J.*, vol. xix. No. 1.

Tigris, it may well aspire to become once more glorious, but certainly not in Turkish hands. There are many pilgrims' shrines. The city has a very motley population of pilgrims and merchants and mendicants, estimated at from 120,000 to 180,000, of whom nearly one-third are Jews.

The trade of Baghdad is valued at over one and a half million pounds. Baghdad has more than 68 mosques, 6 churches, and 22 synagogues. There is a large European community. The population of the whole Baghdad vilayet is placed at 850,000, of which 93 per cent. are Moslems, mostly Sunnite, 6 per cent. Jews, and 1 per cent. Christians. There is a railway from Baghdad to Samara, some 70 miles to the north up the Tigris.

Basra, on the Shatt-el Arab, is another important town, the seat of a Wali. It is the centre of an important trade in dates, and the port for all the region round about. The average annual exports from Basra to London and New York for the five years 1907-12 reached about 20,000 tons. The population in Basra vilayet has been estimated at about one million, of whom 94 per cent. are Moslems, mostly Shiahs.

Kerbela, near Hillah, is a sacred city for Shiahs, for it contains the tomb of Hosein, the grandson of the prophet. Numerous pilgrims believe that once there one has nought to fear for the next world.

Farther down the river are Kufa and Nejef, both on the border of swamps.

Kuweit, or Grane, on the Persian Gulf, has the finest harbour in all eastern Arabia, and a population of about 120,000. It is the probable terminus of the proposed railroads to the Persian Gulf, and is partly in the hands of Britain. It is surrounded by deserts on which the Bedouin tribes often encamp, bringing with them horses, cattle, and sheep to barter for dates, clothing, and firearms. The large village of Ctesiphon, on the left bank of the Tigris, opposite to the ruins of Seleucia, has now become famous as the theatre of a recent battle with the Turks. It was once the winter residence of the Parthian kings. Along the rivers are settled poor Muntefik Arabs who cultivate the soil.

Interior.—The six provinces we have passed in review are on the outskirts of Arabia, and the vast interior of the great peninsula, the greater part of which remains unexplored, remains for consideration. Four regions can be distinguished here: Jebel Shammar, with El-Hamad on the north, Nejran on the west, Roba-el-Khali on the south, and Nejd, or El-Nejd proper, in the very middle of the peninsula. The first is a region of *Nefud*, or sandy deserts, inhabited by Bedouins having no rulers save their sheikh. There are some oases, among them *Teima*, remarkable for the size and cleanliness of the houses, the abundant water supply, and the beauty of its women.

Roba-el Khali, which signifies "empty abode," includes all the hinterland of the Mahrah and Gharah tribes, the Dahna desert and El Akkaf. It is almost unknown. It is doubtful if it is all desert, for there are some place-names, such as Jebel Athal, Tamarisk Mountains, Belad ez-Zohur (Flower-country), El Joz (the nut-trees), which have little in common with desert.

Nejran, north of Yemen, with Danasir-Wady, is a well-watered region with an area of about 30,000 square miles; it is reputed to be even more fertile than the best part of Yemen. There are extensive date-plantations, and its people are all agricultural Arabs. It was visited by Halévy in 1870, who found many ruins. It was here that the Roman army under Aelius Gallus came to grief.

Nejd culminates in the crescent-shaped Jebel Toweyk, and is intersected by numerous well-irrigated and fertile valleys. North of Nejd, separated from it by a narrow arm of northern desert, is the smaller plateau of Jebel Shammar, crossed by the ranges of Aja and Selma. The Nejd proper is a vast table land in central Arabia, with an average elevation of about 3000 feet above the sea, with a gradual ascent southward to the highlands of Yemen and Oman. It is the heart of Arabia, and includes the regions of El-Kasim, El-Woshem, El-Aared, and Yemama. It is a healthy country, enjoying a crisp, dry, and invigorating air. The table-land contains ledges and peaks as high as 5500 feet. The highlands are mostly clothed with pastures, and the plateau is intersected by valleys. Subterranean waters are abundant at a depth of about 15 feet. Nejd is ruled by an Amir, who is believed to be very rich, hospitable, and self-willed. His residence is Hail, amidst a barren country, with a population of about 10,000 within its walls. The Amir's castle is a formidable stronghold. According to Doughty [1] the town is clean, well-built, and pleasant to live in, save for the fear of the tyrant-ruler.

Another important town in Nejd is Er-Riadh, lying about 280 miles south-east of Hail. Since Palgrave no European traveller has ever visited this ancient Wahabi metropolis. To the region of north-western Nefud belong also the towns of Jauf, Orman, and Kaf, visited by the Rev. A. Forder.[2] Jauf possesses a magnificent old castle called Mazed, opened only once a year. It has sulphur springs and large date-groves. It is celebrated for the manufacture of saddle-bags and *abbas*. It is also famous for music, as its people are adepts at playing the rebuba.

Kaf has strong brine springs: large caravans, composed sometimes of 1600 camels, come here for the salt.

Sandy Deserts.—About a third part of Arabia, chiefly on the south, is desert (*Nejud*). The general physical features of this "desert" are those of a plain, clothed with stunted aromatic shrubs of many varieties, some forming excellent pasture for camels and sheep, some worthless. Some Nefuds abound in grasses after the early rains, others are barren all the year; they are covered with long stretches of drifting sand, carried about by the wind and tossed in billows on the weather-side of the rocks and bushes.[3] The Nefud is covered with the ghada bush and a tall grass called Knusi (*Aristida Forskahlii*), excellent for camels.[4] According to Carruthers there are many inhabitated places between

[1] *Arabia Deserta* (Cambridge, 1888).

G.J., vol. xx. p. 619. Zwemer, *Arabia*, p. 21.

[4] "A Journey in North-West Arabia," *G.J.*, vol. xxxv. p. 225.

Ma'an, Jauf, and Teima in north-west Nefud: it is not a hostile desert, for there are good grazing places, and several large wadys and wells sufficient to support a large nomadic population.

The west coast of the Red Sea, between 18° and 22° N., seems to be one of the most desolate regions in the world.[1] Mostly stony, the deserts are in places steppe-like. Sometimes they have a red colour, so that in the light of the setting sun they look as though sprinkled with blood. Those deserts have undulations whose crests rise to about 100-160 feet, and even as high as 330 feet. Clumps of bushes, thorny and dry, with stems about 6-12 inches thick, occur. The products of such deserts seem sufficient for the needs of Bedouins.

The British are already the masters of the land thus briefly described, which is certainly called upon to play in the future at least the same, if not a yet greater, part than it has already occupied in the remote history of humanity. It is highly desirable that attention should be directed to it by all civilised nations, and quite especially by enterprising and practical British explorers and merchants. Britain has already accomplished great things in Arabia. She has surveyed the entire 4000 miles of Arabian coast, has established her power on the Arabian littoral: it remains to her now to go farther, to extend her protectorate over Yemen and Oman, and penetrate into the unknown interior of the vast peninsula.

MEN OF THE OLD STONE AGE: THEIR ENVIRONMENT, LIFE, AND ART.[2]

(With Illustrations.)

THE learned and exhaustive work on this interesting subject, which has been recently published, is from the pen of Professor Henry Fairfield Osborn, D.Sc., LL.D., Ph.D., Research Professor of Zoology, Columbia University. It opens with a discussion of the rise of anthropology and of the geological history of man, and shows how the latter was influenced by geographic and climatic changes. The author gives (after Obermaier) a very informative map of Europe during the period of maximum Continental elevation, in which the coastlines are widely extended, connecting Africa and Europe—including Great Britain and Ireland—in a single vast peninsula, and affording free migration routes for animal and human races north and south, as well as east and west. The ocean boundaries are more remote, and the interior seas are greatly reduced in area. With regard to these remarkable geographic changes, Professor Osborn says: "The migrations of mammals and races of men into Western Europe from the Eurasiatic Continent on the east and from Africa on the south, were favoured or interrupted by the periods of

[1] Crossland, *Desert and Water Gardens of the Red Sea.* 1913.

[2] London: G. Bell and Sons, Ltd., 1916. *Price* 21*s.* We are indebted to the publishers for permission to reproduce from the book the accompanying illustrations.—ED. *S.G.M.*

elevation or of subsidence of the coastal borders of the Aegean, Mediterranean, and North Seas, and also of the Iberian and British coastlines. The maximum period of elevation of the coastal borders, as represented in the accompanying map (Fig. 1), never occurred in all portions of the Continent of Europe at the same time, because there were oscillations both on the northern and southern coasts of Europe and Africa. The early Pleistocene, especially the period of the first interglacial stage, was one of elevation, remarkable for the broad land-bridges which brought the animal life of Europe, Africa, and Asia together. The Mediterranean

FIG. 1.—Europe in the Period of maximum Continental Elevation. After Obermaier.—
From *Man at the Ice Sheet Age*.

coast rose 300 feet. Land bridges from Africa were formed at Gibraltar and over to the island of Sicily, so that for the time there was a free migration of mammalian life north and south. It is to this that Western Europe owes the majestic mammals of Asiatic and African life which dominated the native fauna.

"In general, the *elevation* of the Continent took place during interglacial, the *subsidence* during glacial times, but Great Britain appears to have been almost continuously elevated with a part of the Continent, and was certainly so during the third interglacial, fourth glacial, and post glacial stages, because there was a free migration of animal life and of human culture. The lower Palæolithic peoples of pre-Chellean and

Chellean times wandered at will from the valley of the Somme to the

FIG. 2.—Restoration of the geography of Western Europe during the Third Interglacial Stage. After Lord Avebury.—From *Men of the Old Stone Age*.

not far distant valley of the Thames, interchanging their weapons and inventions. The close proximity of these stations is well illustrated in

the accompanying admirable map prepared under the direction of Lord Avebury (Sir John Lubbock)."

This map (Fig. 2) exhibits a restoration of the geography of Western Europe during the third interglacial stage, showing the ancient land areas (dots) and the ancient river channels now submerged by the sea. It is modified after Lord Avebury's *Prehistoric Times* by permission of Messrs. Henry Holt and Co. The six white crosses (×) indicate the location of the principal pre-Chellean stations of Piltdown on the Ouse and Grays Thurrock on the Thames in England : of Abbeville on the north bank and St. Acheul on the south bank of the Somme, and Chelles on the Marne in France ; and of Helin in Belgium. It will be observed that the English stations are separated from the others only by the ancient broad valley corresponding with the present English Channel.

The term "Chellean" is applied to an Old Stone race inhabiting the station of Chelles-sur-Marne in the Department of Seine et Marne. The pre-Chellean race was one of lower Palæolithic culture. The chief pre-Chellean and Chellean stations were clustered along the valleys of the Somme and Seine. Indications, however, that the primitive industry of Chellean times spread over south-eastern England as well, and that a succession of pre-Chellean into Chellean culture may be demonstrated, occur in connection with the recent discovery of the very ancient Piltdown race.

Piltdown, Sussex, lies between two branches of the Ouse, about thirty-five miles south and slightly to the east of Grays Thurrock, the Chellean station of the Thames. To the east is the plateau of Kent in which many flints of Eolithic type have been found. In a gravel bed at Piltdown, between the years 1911 and 1913, fragments of a human skull were discovered which belonged to the most ancient human type in which the form of the head and size of the brain are known. Professor Osborn gives several restorations (one quarter life size), modelled by Mr. J. H. M'Gregor, of the "Piltdown man of Sussex, England," and remarks that its antiquity is variously estimated at 100,000 to 300,000 years. This reduction of geological or anthropological time to popular "years" is necessarily conjectural. He adds that "the ape-like structure of the jaw does not prevent the expression of a considerable degree of intelligence in the face." The brain of the Piltdown man is in shape and volume much nearer that of modern *Homo sapiens* than that of the chimpanzee.

Another important Old Stone race is that named after discoveries in the Neanderthal, near Düsseldorf. The author gives minute details of the remains of this race, which have been found in France and along the Danube as well as throughout Germany, and extending to the mouth of the Thames. In discussing the environment of this race he notes remains of the woolly mammoth and indications of a well-marked temperate flora. This is the life of the period of the fourth glaciation, with warm summers, and probably migrations of mammoths, rhinoceroses, and reindeer. The woolly rhinoceros was the invariable companion of the mammoth (Fig. 3), even as Merck's rhinoceros always associated itself with the straight-tusked elephant.

With regard to the men of the Neanderthal race, their jaws were distinguished by great thickness and massiveness, and their teeth formed a closely set row, with a deeply receding chin contrasted with the high chin prominence of *Homo sapiens*. "In many characteristics," says the author, "the Neanderthal skull is shown to be nearer to that of the

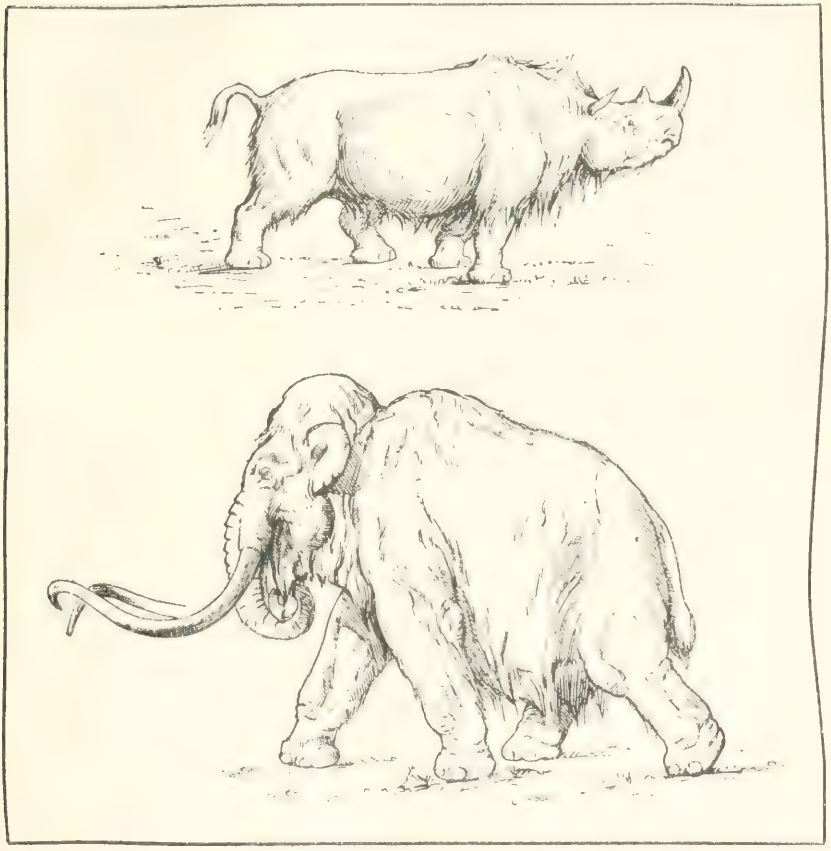


FIG. 3.—The two large tundra mammals: the woolly rhinoceros (upper), drawn from the work of Upper Palæolithic artists and from the specimen discovered in Starunia, Galicia, Austria; the woolly mammoth (lower). These hardy animals gradually replaced the African-Asiatic pair, Merck's rhinoceros and the straight-tusked elephant. Drawn by Erwin S. Christman, one-sixtieth life size.—From *Men of the Old Stone Age*.

anthropoid apes than to that of *Homo sapiens*." At the same time, "Darwin was compelled to admit that the famous skull of Neanderthal was well developed and capacious.' The height of the men rarely exceeded 5 feet 5 inches, and of the females 4 feet 10 inches; recalling the "little dark race" of legendary lore.

"In the whole racial history of Western Europe," says the author, "there has never occurred so profound a change as that involving the

disappearance of the Neanderthal race and the appearance of the Crô-Magnon race. It was the replacement of a race lower than any existing human type by one which ranks high among the existing types in capacity and intelligence. The Crô-Magnons belong to *Homo sapiens*, the same species of man as ourselves, and appear to have been the chief race of the upper Palæolithic period up to the very close of Magdalenian times, after which they apparently underwent a decline." The term Crô-Magnon is derived from a locality of that name in the Dordogne, France. Allied to the Crô-Magnon is the Grimaldi race, well exhibited in the celebrated "Grottes de Grimaldi" near Mentone, described in this Magazine in 1903 by Mr. Richardson after a visit which he paid to them.

Professor Osborn next contributes a fascinating chapter on "The Birth of Art," showing that, however rude the men of the Old Stone Age were, they were penetrated with ideas of Art, as the Grimaldi relics proved, and were also subject to the sway of Religion. The author gives a remarkable series of drawings and paintings executed by these men, some exhibiting the most realistic portraits of the wild animals which were the objects of their chase.

In concluding this masterly work, Professor Osborn observes that during the Old Stone Age "the rudiments of all the modern economic powers of man were developed: the guidance of the hand by the mind manifested in his creative industry; his inventive faculty; the currency or spread of his inventions; the adaptation of means to ends in utensils, in weapons, and in clothing. The same is true of the aesthetic powers, of close observation, of the sense of form, of proportion, of symmetry, the appreciation of beauty of animal form, and the beauty of line, colour, and form in modelling and sculpture. Finally, the schematic representation and notation of ideas, so far as we can perceive, was alphabetic rather than pictographic. Of the musical sense we have at present no evidence. The religious sense, the appreciation of some power or powers behind the great phenomena of nature, is evidenced in the reverence for the dead, in burials apparently related to notions of a future existence of the dead, and especially in the mysteries of the art of the caverns."

When it is added that the work is embellished with 268 beautiful illustrations and maps, we are not surprised to learn that "four large editions of this book have already been called for in America." R. R.

SYRIA: THE PRESENT AND THE FUTURE.[1]

This book, whose author is apparently a Syrian, has for its main purpose the attempt to prove that the only hope for the unhappy country of Syria lies in the establishment of a French Protectorate, with a French resident. Many of the arguments upon which this position is based are

[1] *La Syrie de demain*. Par Nadra Moutran. Paris: Plon-Nourrit et Cie, 1916. *Prix* 6 *francs*.

necessarily political and outside our sphere, but in the course of his discussion the author gives much information in regard to present-day conditions in Syria. It is the more desirable to have these clearly set forth, in that in many respects the descriptions apply to Turkey generally, and, while Turkish maladministration has become a proverb, there are probably not many, even among geographers, who could indicate exactly the mode in which the central government acts as a blight upon agriculture and commerce, and tends to crush all effort at improvement upon the part of its subjects.

The book has also the great advantage of being written by one who is or has been a Turkish subject, and is free from all illusion as to the effect of any European interference which stops short of a protectorate or of annexation. Most of the other available books upon Turkish rule have been written by Europeans, who can scarcely be supposed to know, as accurately as those who have been beneath the Turkish harrow, "exactly where each tooth-prick goes."

On the subject of "reforms" in the Turkish Empire under European supervision the author has indeed no illusions. He points especially to the conditions in Macedonia when this solution was adopted, and, in a felicitous phrase, states that in that country "the different Balkan nationalities never carried on more energetic intrigues, never assassinated each other more cordially than under the régime of those famous reforms."

In Syria the nationalities are even more mixed than in Macedonia, and though of the total population of about three and a half millions over two millions are Sunnite Mahometans, yet the minority are divided among fifteen creeds and sects, and even the Sunnites are far from living in harmony with each other. M. Moutran believes that these facts make the idea of an independent or semi-independent Syria under a native prince an impossibility, and says of Syria, as has been said of other parts of the Turkish Empire, that the great mass of the people would accept any rule which would give them justice and security for life and property He adds that the proximity of Egypt, and the knowledge of the improvement in the condition of the peasants which has been effected there by the British, has increased the restlessness of the Syrians.

Syria consists of the vilayets of Beyrut, Damascus and Aleppo, and the sandjaks of Jerusalem, Lebanon and Zor, giving a total area of nearly 107,000 square miles, an area not very greatly inferior to the United Kingdom without Wales. But to these in a post-bellum Syria the author considers that the vilayet of Adana and the sandjak of Orfa should be added, which would give an additional area of 27,000 square miles, and increase the population by three quarters of a million.

Scanty as the population may well seem, it is being further depleted by emigration, due in large part to the stagnation of agriculture. When, says our author, the Maker of the Universe some time ago undertook an aerial voyage over the earth, he was accompanied by the archangel Gabriel, who indicated in turn the names of the countries observed. But when Turkey was reached this became unnecessary, for that country had undergone no change since its creation! The causes

of the backward condition of agriculture are considered in detail, and it is not without interest to note that state ownership of property in land, regarded by some as the ideal condition, is in Syria believed to be one of the main causes of the decay of agriculture. For the moment, in the author's caustic phrase, only houses, buildings, factories, gardens planted with trees, and agricultural land situated within the limits of towns and large villages can be privately owned. All other land belongs to the sultan, and is only in the occupation of individuals. Even so, however, the limits of the individual holdings are not defined, and there is no cadastral survey. Thus a title to land takes such a form as the following—M. Saba possesses, in the estate called Ali-Nahri, three and a half parts out of a total of three hundred parts. In other words the land is undivided and is shared in common by a large number of cultivators. No individual can reckon on a particular plot for more than one year, and therefore no individual will expend money or labour in improving land of whose continued possession he is not assured. The first great piece of work to be undertaken after the war is therefore a cadastral survey, followed by a division of the land.

But even this great problem of land tenure seems to weigh less heavily on agriculture than the system of taxation, and the vast corruption with which it is accompanied. It is stated that the gendarmerie obtain from the people in the form of bribes as much as does the Treasury in its land tax, and that the more influential manage to make the bribe take the place of the tax, which is allowed to fall into arrears by complacent officials. The land taxes take two forms, one direct on the land and one indirect, based upon its yield. The first varies with the nature of the land, being ·4 per cent. on land capable of cultivation, ·8 per cent. when the lands lie within a town zone, and 1·2 per cent. when they are planted with trees, whether poplars or others. The second tax is the tithe upon the yield, and though theoretically 10 per cent., is in practice 12·75 per cent. If the land yields cereals or silk then the tax is paid in kind; in the case of all other products it is levied in gold, on an estimate made by the authorities. But heavy though these taxes are, it is less their weight than the manner in which they are levied which has the blighting effect.

In the first place, as already suggested, individuals of political or social status can evade the taxes, in whole or in part. Thus in the neighbourhood of Damascus there is a village whose lands are uniform in their products, and are worked in common. But of these lands half belong to the inhabitants and half to an influential Kurd. The latter pays 3000 francs in tithe, the former 24,000 francs. Of such cases, the author states, there are many examples.

Secondly, the method of collection is a veritable plague. In theory the mayors of the villages preside over the collection, but in practice "rapacious gendarmes, commanded by a tax-gatherer without faith and without law, fall upon the villages, under pretext of collecting the taxes." The collectors live at the expense of the villagers during their visit, pillage and steal without mercy, and under one pretext and another demand heavy bribes. All this occurs in connection with the collection

of the land tax, and the consequences are so disastrous that many villages give up one-third of their produce to some influential person, who undertakes to pay the taxes, and protect them against pillage by the authorities.

The collection of the tithe gives rise to greater scandals still. The government is ready to sell the tithes to the villagers, provided these are willing to pay more than their true value. Otherwise they sell them to speculators, who accuse the peasants of stealing the grain, while it is still in the field. As they are always supported by the authorities in their exactions the peasants usually end by giving up 20 per cent. of the product, in place of the legal 12·75 per cent.

In the case of vegetables and fruits, especially grapes, conditions are even worse. In this case the yield of the crop is estimated by experts, whose estimate may be thrice or even five times in excess of the real quantity. Then the Administrative Council fixes the value of the produce, again in excess of the market price. M. Moutran gives as an example, what one must suppose to be an exceptional case, where a cultivator having in reality 600 kilos of grapes, with a market value of 60 francs, finds his crop estimated at 1800 kilos, with a value of 900 francs. On this estimate his tithe would be 113 francs, or nearly twice the total value of his crop!

But that such conditions, even if unusual, do occur is suggested by a statement in another part of the book that in the year 1902, in one locality, the peasants tore up 400,000 vine stocks, rather than continue to pay tax on the grapes these were supposed to produce. The loss to the country is all the greater from the fact that the vine prospers throughout its extent, and that there are a large number of excellent varieties. Further, the country is well adapted to produce a great variety of other sub-tropical fruits and vegetables, but this difficulty of the tithe, and the method by which it is levied, crushes all initiative. M. Moutran adds a number of detailed suggestions by means of which, under French rule, the imposition of taxes might be rendered just and equitable, but with these suggestions we are not directly concerned here.

Taxed as he is, and robbed instead of assisted by his government, the peasant must naturally have recourse to money-lenders, to pay his taxes, or to save himself from further pillaging by officials. The private lenders, as is natural when social life is so insecure, demand ruinous rates of interest. Further, the mortgaging of the peasants' land to banks, which are mostly controlled by foreigners, would, as the central government was acute enough to perceive, constitute a real danger to the Turkish State. Therefore the Sultan Abdul Hamid, who, the author remarks in a parenthesis, would have been one of the best sultans Turkey ever had if he had not been led astray by "the mania of fear," founded a Land Bank.

The capital for this was raised by an additional tax of 1·5 per cent. added to the tithe, an equal sum being given by the State. The capital so raised was to be lent to the peasants at a rate of 6 per cent., the security being a state mortgage on their lands. In point of fact, however, the unhappy borrower had to grease so many palms before his

application for a loan was granted that in the end the rate of interest came to 15 to 20 per cent. per annum. But even this was not all, for the State found the temptation of the Bank's coffers too great, and, on the excuse of provisional loans, has up to the present removed some 150,000,000 francs from the Land Bank. Since, says M. Moutran, the Ottoman Government is the least solvent of the debtors of Europe, this sum must be regarded as definitely lost, so that the peasants have paid an extra tax without obtaining corresponding benefits.

The conditions just described have had upon the Syrians the effect which was to be expected, in causing them to emigrate from their country, and in weaning them from agriculture to trade, and especially small trade. Large numbers have emigrated to the Americas, and there have promptly abandoned the plough for commerce.

It is interesting to note that the effect of the incoming of the Turks upon Persians, Greeks, Armenians, which was discussed here on p. 216, has thus taken place also with regard to the Syrians. The people of Syria "have monopolised the commerce of their own country, and of a part of Turkey. The Greeks, the Armenians, and the Jews, despite their reputation, have never been able to prevail in the struggle against Syrian traders, and their business houses are not represented in Syria." Wherever the inhabitant of the Mediterranean belt is torn from his steep hillsides he seems to take naturally to commerce, to distribution rather than to manufacture, to the trade in valuable goods which can be hidden from the tax collectors rather than to dealings in bulky necessities. The two facts that the people of Syria are tearing up their vine stocks in hundreds of thousands, and that in America, in Egypt, in parts of France, especially in Paris, they are very successful as traders, seem to us to be of great importance in understanding the Near Eastern question.

Within their own country the Syrians' commercial proclivities are considerably handicapped both by the capitulations and by the internal fiscal arrangements, whose combined effect is to differentiate against home products. Foreign products entering the country pay a uniform tax of 8 to 11 per cent., while on the other hand home products are taxed to the extent of 20 per cent. This renders, for example, Syrian alcohol, made from grape juice, unable to compete with wood and other spirit of foreign origin. In brief, in this "pays de Cocagne," which is the Turkish empire, customs tariffs have for object the ruin of home industry and the protection of foreign commerce. Thus the unfortunate inhabitants of that empire have not only to satisfy the rapacity of their own government, but have indirectly to subvention the Powers who have kept that government in being.

Among the minor causes for the stagnation of Syria are the bad condition of the roads, the paucity of railways, the want of bridges, the neglect of irrigation and drainage, and of public works generally.

In connection with means of communication the author notes that the telephone does not exist, telegrams take longer to reach their addressees than the time required for an ordinary traveller to cover the distance concerned, and finally, as a general rule, letters tend to

"wander from town to town in search of the address given, as the people of Israel wandered for forty years in the desert of Sinai."

But M. Moutran candidly remarks that the Turkish mode of address does not conduce to speedy delivery, and the proportion of irrelevant to essential matter contained in the following example, which he gives from an envelope actually in his possession, might well discourage the most zealous of postmasters. The envelope reads as follows:—"By the grace of God may this letter have the joy of being read by him who is the most respected, the most glorious one, he whose valour is sublime and whose qualities are perfect, our cousin Ali Mustafa Mazbuh, the honoured one, whom may God keep in the name of our Lord the Prophet, and his companions, and his family without exception. Amen, oh my God, Amen, in the name of the Lord God, Creator of Worlds. Postscript.—The said Ali Mustafa was a cobbler in the bazaar of Bab-el-Brid at Damascus, and moved to Nebk, where he carried on the same occupation, and was then appointed keeper of the ruins at Baalbeck. May God grant an entry to paradise to whosoever delivers this letter to him. Amen." In our own post office it may be thought that the reward suggested is scarcely too great a return for the labour involved in deciphering many such inscriptions!

Lengthy as this review is we have only touched upon a tithe of the subjects dealt with in the book, and have omitted all reference to political matters. We can recommend it to all those who are interested in problems of Turkish rule, and it has an additional interest at the present moment, when there is evidence of widespread distress in Syria. As we have hinted, the author has both humour and wit. We cannot refrain from quoting one other of his stories, an interview between Kiamil Pasha and the Austrian ambassador. The exact date of the incident is not given, but we presume that it was during or immediately before the Balkan wars. Kiamil Pasha said at Constantinople to the ambassador, "Austria abandons us then: she will give us no help! So be it, but remember what I prophesied to you—we shall die together, yes, together!" The oppressed subjects of both monarchies may well hope that the prediction is on its way to fulfilment.

The book, which runs to nearly 500 pages, has three sketch-maps and a graph, and among the subjects which we have not touched upon is a very full treatment of the races and religions of Syria.

KŪT-EL-AMĀRA

By Lieutenant-Colonel A. C. YATE.

THE origin, pronunciation, and meaning of the name Kut-el-Amāra, which has now taken its place permanently in British history and chivalric record, has for some time past been the subject of discussion among those who can pretend to some knowledge of Oriental geography and speech. Amongst the uninitiated the name has suffered strange vicissitudes. Some one—"unspeakable," but certainly not a Turk—permeated by that spirit which can evolve cinema out of kinema,

introduced to the journalistic world the form "Cut-el-Amara," and perpetrated, on the strength of it, the pun "cut and come again."

This subject was revived the other day, in dinner-table talk, by three persons of distinction in Eastern affairs, and nothing would convince one of them that "Cut-el-Amara" was not correct; and he further insisted that "Muhammera" was akin to it. I pointed out that Mr. Percival Landon, when he lectured before the Central Asian Society, pronounced it "Kut-el-Amara," and informed me specifically that, to the best of his knowledge, that pronunciation was correct. I added that the principle on which the Arabic language was built up did not suggest any affinity between "Amara" and "Muhammera," or "Muhamra," as it is now often spelt in books and maps. My friend was not convinced.

Finally, I suggested that the point should be referred to professorial authority—and it has been. This is the professorial reply:—"You are quite right about the pronunciation of *Kût-al-Amara* (Kût like 'coot'), but the origin of this word is doubtful, and I have heard no very satisfactory explanation. Some hold it to be an Arabicised form of the Indian *koth* (castle, fortress), which occurs in Persian with the ordinary soft *t* in *Kotwal*, the Warder of a castle. Le Strange writes it in his book, *Lands of the Eastern Caliphate* (pp. 27, 38, and 60), as *Kuṭ* (or *Quṭ*) with the hard *ṭ* (ط), so that he must have found it in the mediæval Arab and Persian geographers in this form—قوط العمارة. He says he thinks *qut* is a Turkish word meaning 'intestine, gut.' The only Turkish word like this is كوت, which the Turks pronounce 'gyut,' meaning the rectum or anus, but I doubt this derivation. He thinks it is applied to a narrow bit of a river, just such as is called a 'gut' here. On modern Turkish maps it is written with the soft *k* and *t*, as كوت العمارة. The name كويت (Kuwayt or Koweit) is in any case the diminutive of it, and should mean 'the little gut.' Our Egyptian Shaykh says the word is certainly not Arabic. The two derivations given above—one Turkish and one Hindustani—are the only two I have yet come across, and neither seems very satisfactory. Turks are equally unable to explain the word. The construction, of course, is Arabic; so is the word al-'Amara, meaning 'the building.' Kût is evidently a purely local word. I cannot find it in any dictionary."

To further pursue my inquiry I visited an Egyptian curio-dealer who has travelled in Turkey, Persia, Afghanistan, China, etc., and asked his opinion. He spelt it كوت, pronounced it "Kyut" (*u* as in French), and said it meant a "valley," and that "Kut-el-Amara" meant "the valley of Amara." This interpretation receives countenance from the opinion of an Indian Mussulman of high distinction as a scholar and a Government official. He writes:—"I think the word 'Kut' is the Arabic كوة, pronounced 'kuwwat,' which means 'a narrow passage.'" Kut-al-Amara, therefore, probably means "the passage of or to Amara." Richardson, *Persio-Arabic Dictionary*, explains كوة as a "niche," or narrow

orifice. The term may apply to the channel of the Tigris at this spot. Mr. Le Strange's "gut," mentioned above, is akin to this.

I have it on the authority of a competent Arabic scholar that "The name Amāra in Kūt-el-Amāra is not the same name as that of the town 130 miles above Basra. The latter (*'Amāra*) begins with an *ain*, whereas *Amāra*, in Kut-el-Amara, is written with an *alif*: this word *amāra* has the meaning 'sign, signification,' and is from the root meaning 'to ordain,' from which the title Emir is also derived." The map in Chesney's *Euphrates Expedition* writes the name "Kut-el-Amra, or el-Imareh."

The index to Stieler's *Atlas* gives nine names compounded with Amar and Amara, all in countries where Islam and Arabic have long been predominant. Arabic scholars agree that "Amāra" comes from one or other of the triliteral roots "عمر" or "امر," the first signifying "habitation" and the second, which means "command," being familiarly known to all the world in the form of the title "Amir," *i.e.* "commander." It may then be accepted that the word Amara is of Arabic origin.

The word "Kut," as seems likely, is not of Arabic, but of local origin. This opinion is endorsed by the professorial letter which I quoted above in full. Three authorities to whom I have applied suggest severally as its meaning, "a valley," "a narrow passage," and "a fort," and a fourth, a person long resident on the Tigris and Karun rivers, states that "Kut" means *a fixed settlement* as opposed to the shifting camps of the nomad Arabs. A walled village and a fort are synonymous terms in these as yet unsettled districts. Turning to works of reference, I find the *Nouveau Dictionnaire de Géographie Universelle*, by Saint-Martin and Rousselet (Paris, 1887), mentions "Al-Kout," on the Euphrates, in the Province of Basra; and Andree's *Hand Atlas* (1914) mentions "Kut-el-Hai" and "Kut-Kleiban" respectively on the Shatt-el-Hai and Shatt-el-Arab, and three or more names of places compounded with "Kūt" in the valley of the Karun. The Index to Stieler's *Atlas* gives twelve names of places compounded with "Kut," all in countries in which the faith of Islam has long possessed a monopoly. The map in Curzon's *Persia*, most carefully prepared by a Fellow of the Royal Geographical Society twenty-five years ago, also shows a number of Kuts. I shall again refer to that valuable map. Another Arabic scholar dwells on the affinity of "Kut" to the Indian word "Kot," and the Sindhi word "Got." The first Mohammedan invader of India reached Sindh from Mesopotamia via Mekran. Did he introduce or borrow the word?

Although I cannot pretend to have traced Kūt-el-Amāra to its certain source, I have thought it worth while to bring together such information as I could collect. More competent scholars and travellers may settle the point. Kut-el-Amāra, associated with the name of General Townshend and with the memory of the gallant Britons who fought, endured, and died there, is, historically, British property, and may become British territory. The land for which Romans and Persians fought, and whose monumental irrigation works British and French engineers had begun to recreate, is one which must, I think, form part

of and a link in the British Empire. What those irrigation works mean may be well learnt from an article in *Blackwood* for March 1916, entitled "Two and a half years in Mesopotamia," by Sir William Willcocks. I chanced during the last few days to have come across and re-read some letters from Herr Eugen Wolf, an extensive traveller, and, with Major von Wissmann, the founder of German East Africa. Letters after a lapse of years acquire enhanced force. Wolf writes in July 1899, "German enterprise all right. *German railway to Indian Ocean* all right." I hardly grasped in 1899 what Herr Wolf meant, but in 1916 I venture to think that, from his point of view, it is *not* "all right."

The map in Curzon's *Persia* enabled me to explain a puzzling passage in Chesney's *Euphrates Expedition*, which says, p. 101, "We continued to drop down this now (1868) tortuous stream (the Karun), by Kut-el-Omrah, and thence to Sablah, a small village on the left bank, which is rather remarkable as being the point from which the Karun-el-Amarah (or Blind Amarah) takes its departure." This exercised me, until I turned to the Curzon map and found the correct name of the channel which, branching off at Sablah, enters the Persian Gulf between Khor Musa and the debouchure of the Shat-el-Arab. The correct name is Karun-el-Amieh, عامي (ʿami) being the Arabic for "blind."

GEOGRAPHICAL NOTES.

EUROPE.

The White Sea.—According to a note in the *Revue Générale des Sciences* the White Sea does not merit the evil reputation which it has received of being ice-encumbered for nearly eight months of the year. According to the observations of M. Gilinsky it cannot be regarded as an inland sea, but is in point of fact merely a gulf of the Arctic Ocean, possessing all the characteristics of that ocean. Thus it has the Arctic tides, like the Arctic Ocean its waters are highly saline, and it has, especially in autumn and winter, a relatively high temperature, due to the fact that the winds of September and October drive into it the waters of the Atlantic drift. The result is that its coat of ice is neither continuous nor permanent. Till the month of January the sea is free from ice, and then a thin coat forms along its shores, especially from the mouths of its affluents. The result is to give rise to an ice covering which is wide towards the interior and narrows to the mouth of the gulf, but is never thick, and is liable to be broken up by winds and currents. At the same period ice forms in the open ocean. But even during February and March, when the ice is most dense, an experienced navigator can find his way through, as was shown by a journey made in February-March 1915, by a vessel which set out from Alexandrovsk and succeeded in reaching Archangel safely.

In spring, though the ice melts at the surface with the sun's heat, the cooling of the water cements it into denser blocks below, making it more resistant to the passage of a ship. The disappearance of the ice

cover is due to two causes: the melting of the ice in the great affluents, and the prevalence of winds from the south-west and west. The first cause, if acting alone, does not produce melting till nearly May, but the winds may clear the sea while the estuaries remain blocked. The very optimistic conclusion is reached, that for eight to nine months of the year navigation is possible without danger from ice, and that for the remaining three to four months some amount of movement is possible under certain conditions. The author seems at least to prove that neither the winds nor the currents of the sea are adequately known, and that the establishment of hydro-meteorological stations, and a better equipment of lighthouses, ports, etc., would considerably extend the period of easy navigation in the sea. It is to be noted that, up to the present, all navigation in the White Sea has tended to cease each season as soon as the rivers which enter it have frozen over, but the construction of the Murman railway (cf. p. 147) may make it worth while to continue steamboat traffic in the White Sea even after the river service has stopped for the winter.

The Future of Alsace-Lorraine.—A recent issue of *La Géographie* contains a report of a lecture delivered before the Paris Geographical Society by M. l'abbé Wetterlé, formerly deputy for Alsace-Lorraine in the Reichstag. The report has been censored, a somewhat unusual feature in an address to a Geographical Society, but the parts which have been permitted to appear show that it dealt with the question as to the exact fashion in which Alsace-Lorraine could be reunited to France, in the event of an issue to the present war in favour of the Allies. M. Wetterlé pointed out that the inhabitants of the region, in the persons of their deputies, solemnly protested in 1871 against the annexation to Germany. Thus in his view the fact that the French Government has declared the treaty of Frankfort to be null and void, means that Alsace-Lorraine should return automatically to France as a matter of simple right, without a plebiscite or the necessity of consulting the people, and that there can thus be no question of Germany ceding a territory which was never united to the German Empire by its own consent. It follows from this that in his opinion the original French inhabitants and their descendants only should be regarded at the conclusion of peace as French citizens, while the German immigrants, introduced with the deliberate intention of germanising the region, should be regarded as aliens who could only acquire French citizenship under the usual conditions which apply to domiciled strangers. In an eloquent speech made before the delivery of the lecture M. Schrader pointed out that before 1871 neither the Vosges nor even the Rhine formed, in the strict sense of the word, a frontier. The Rhine, so far from being a barrier, was a link between peoples, united, in spite of political frontiers, the people of the east and the west, linking together the minds and the customs found in two types of civilisation. "It was against this influence of a civilisation too expansive and too humane, made for all and not for a caste of petty squires, that the heavy hand of Prussia struck. For that purpose, carrying out her perpetual

policy of invasion, she substituted the mountain frontier which separates for the river frontier which united. To the relations which existed in the wide and hospitable valley have succeeded the harshness of the mountain and the severities of proscription."

Russian Podolia.—M. Himner contributes to the *Annales de Géographie*, for March 15 last, a short article on the entrenched meanders of the Dniester in Russian Podolia, and on the distribution of settlements there. The article is not accompanied by a map, but the sheet *Zitomir, North M. 35* of the 1 : 1,000,000 map shows the district discussed in some detail.

M. Himner begins by pointing out that Podolia is a plateau formed of horizontal beds, much dissected by the streams which descend towards the Dniester. The main stream, both in Russian territory and in Galicia, flows in a valley with a mean depth of about 150 metres, and shows striking examples of entrenched meanders. The numerous affluents which enter from the north also meander, and flow in deep parallel valleys, similar to that of the Dniester. All these valleys have been excavated, first in soft calcareous beds of Tertiary age, covered with black earth and loess, and then in Silurian calcareous beds, which are very much harder. The affluents show spring flooding, for the climate is relatively severe, and the winter snowfall considerable. Nevertheless they do not seem to be eroding their beds, their activities being limited to the movement of alluvial deposits. In Galicia many of the meanders on the main stream have been cut off, a striking example of ancient date being that near Okna. In Podolia this is rare, the only example seen by the author being one near Studenitsa. Here the amphitheatre left by the cut-off has permitted the establishment of three settlements, the large village of Studenitsa and two others. The fact is interesting, because in Podolia, as contrasted with Galicia, habitations on the plateau are rare, and settlements can only appear where the presence of a meander gives room and the possibility of defence near the main river, or in the lateral valleys. At the same time the plateau, which was formerly forested, has been cleared by the peasants to whom the land was sold by the former large proprietors, and is cultivated by them, so that the villages are at some distance from the fields, and communication is not easy owing to the steep valley walls. The villages date for the most part from the Middle Ages, and M. Himner finds the reason for their curious position in the insecurity of the plateau during the long period when it was liable to be ravaged by the Turks and Tartars. Near some of the villages there are caverns, and in one locality certain deep caves contain many skeletons of men, women, and children. A tradition asserts that the village was attacked by the Tartars, who found that the inhabitants had fled to the caves, and besieged them till the people within died of famine. In Galicia, on the other hand, which escaped the ravages of the Turks and Tartars, the villages occur chiefly on the plateau, and numerous finds of Neolithic age suggest that they have occupied the same sites since prehistoric times.

Investigations, as yet of a somewhat summary kind, by M. Himner

show that in Podolia the margin at least of the plateau was inhabited in earlier times. Sites which have been excavated have yielded remains of dwellings, pottery, and utensils of various kinds, belonging to the Neolithic period. The use of wood and the presence of bones of the wild boar show that the region was forested, while wheat and oats have been found, with representations on vases of the cow and pig. The civilisation represented seems to have been fairly advanced, and the vases show considerable artistic taste. Some types show a resemblance to the pre-Mycenæan art of continental Greece.

Studenitsa, as already stated, is on the main stream, but the lateral valley of the Smotrich shows at the town of Kamenets-Podolski another interesting example of a meander town. Here the stream forms a bend in the form of an ellipse, and had virtually or actually achieved a cut-off when the site was adopted, owing to its defensive properties, as the basis of a settlement. The town here appears to be very ancient, and in the Middle Ages Kamenets-Podolski was the capital of the Polish province of Podolia. The town itself was placed originally on the flat ground at the bend of the river, and the bridge which connected it with the plateau was protected by a fortress. A barrage placed upstream made it possible to flood the whole meander, and thus surround the town with water. In 1672 the town was besieged by the Turks for several months and finally captured. Since the Middle Ages the town has been gradually extending to the plateau, and the recent construction of a railway station there can only tend to hasten the migration: it still forms, however, an excellent example of a "meander town."

In conclusion the author gives it as his opinion that Podolia, placed at the margin of the great forest zone, at once warmer than Russia proper and less dry than the steppes further south, was early occupied by man, and became the seat of a relatively advanced civilisation, contemporary with the pre-Mycenæan civilisation of south-east Europe.

Asia.

The Recent Eruption of Yake-Dake.—In the Rev. Walter Weston's article on the Japanese Alps, in our last issue, mention is made (p. 314)[1] of the eruption of Yake-Dake, which took place in June 1915. In the May issue of the *Geographical Review* Dr. Sidney Powers describes a visit paid by him to the region in the August following the eruption. The article is illustrated by some fine views, showing the changes caused by the outbreak.

In regard to the actual eruption Dr. Powers was not able to collect a large amount of information. At seven o'clock on the morning of June 6 earthquake shocks of increasing intensity seem to have been felt, a specially strong concussion being noticeable as the mountain was split open by a fissure on the east side from near the base to within a thousand feet of the summit (8000 feet). The activity continued all day, and

[1] It should be noted that the omission of a comma after the words "since our visit," in the sentence alluded to in Mr. Weston's article, renders the meaning a little obscure. The date given refers to the eruption, not to the visit.—Ed. *S.G.M.*

rocks, ashes, mud, steam, and "smoke" were ejected. Along the fissure a number of new craters opened, the most active being at an elevation of 7000 feet. The sliding down of masses of stones and mud blocked the stream and caused the lake of which mention was made in Mr. Weston's article. Minor explosions also occurred on the second day after the outbreak, and more landslides took place then.

At Dr. Powers' visit in August steam was issuing in quantity from a hole in the uppermost crater, and also from many other places in the fissure, but there was no evidence that lava or bombs had anywhere been ejected, and the eruption seems to have been merely a series of steam explosions. The lake formed by the damming of the Azusagawa river was then about half a mile in length, but of no great depth, and as the stream is rapidly wearing down the blocking mass of débris, it is probable that in a few years only a marsh will remain.

Polar.

The Shackleton Expedition.—Immediately after the article on this subject in our last number (p. 315) had been passed for press, there arrived a telegram from Sir Ernest Shackleton, dated June 25, and despatched from Port Stanley, saying that the *Instituto Pesca* had been obliged to return there, the attempt to reach Elephant Island having been unsuccessful. The telegram, which was addressed to the *Daily Chronicle*, goes on to say that the ice conditions were found to be much heavier than in the previous attempt made in May from South Georgia in a whaler. Stream ice was encountered 60 miles north of Elephant Island. The telegram goes on to say:—"We passed through this successfully, and reached within 20 miles of the island, but owing to heavy impenetrable pack, interspersed with numerous icebergs and a high north-westerly swell, we found it impossible to proceed. The ice stretched in crescent form from west-north-west through south to north-east, the two horns being 60 miles from the island. This winter's ice conditions are so bad that the ultimate rescue can only be effected with a wooden vessel or an ice-breaker. As regards food, there seems to be hope of penguins, as we saw Gentoo penguins at the edge of the ice, and these would supplement the food ashore, which mainly consists of Bovril rations having high calorific value. Wild, seeing the ice conditions, would at an early date drastically economise his stores, and would go on half rations, supplemented by penguin. Seven miles north of the ocean camp we formed, when the *Endurance* foundered, we left twelve cases of these sledging rations, but I cannot say if the party can reach them. Though they are hard pressed, hope must not be given up of their ultimate rescue."

On July 12, Sir Ernest Shackleton made a second attempt to rescue his comrades, leaving Punta Arenas on the 70-ton wooden schooner *Emma*, provided and equipped for him by the British Association of Magallones.

The American Crocker Land Expedition.—It is stated in *Science*

for June 16 that a second relief expedition is to be sent out in the hope of rescuing Mr. Donald Macmillan and the members of the Crocker Land Expedition (cf. vol. xxxi. p. 155 *et antea*). The party is believed to be several hundred miles north-west of northern Greenland, and the first relief expedition is frozen in at Parker Snow Bay, 150 miles south of Etah. The steamer *Danmark* has been chartered for the relief expedition, and it is believed that both parties are in urgent need of rescue. In connection with the expedition, it may be noted that it appears now to be accepted that Crocker Land does not exist, Peary having been deceived by a mirage. Curiously enough the Macmillan expedition were temporarily deceived by a similar phenomenon, before reaching the supposed site of Crocker Land.

General.

The Cause of the Ice Age.—Mr. Fredrik Enquist sets forth in the *Bulletin* of the Geological Institution of the University of Upsala (xiii. i.) a theory on the causation of the Ice Age, with a discussion on the geographical consequences of the theory. The paper is of a preliminary nature, and is to be followed by a fuller treatment of the subject. While studying the present distribution of glaciers in northern Scandinavia the author has been struck by the remarkable regularity in the distribution of the existing glaciers. He illustrates this point by a sketch-map with contours placed at a distance of fifty metres. On this map is plotted a line which is so drawn that within it are included all mountain summits which bear glaciers, while outside of it there is no glaciated mountain. This line defines a glaciated surface, which in the east of Swedish Lapland lies at a height of 1850 metres, while near the Norwegian coast it sinks to 1000 metres. Eastwards this glaciated surface is nearly uniform, while on the seaward side it shows striking elevations and irregularities. Now the difference between the Ice Age and the present lies in this, that during the period the glaciated area had a much greater size than at present, this being due to the fact that the ice-covered surface extended to a much lower level than it does now. This extension must have been due to one of two causes, either a general alteration of climate, or a sinking of the sea-level. It is in a general sinking of the level of the sea that the author finds the cause of the widespread glaciation, while the alternation of glacial and interglacial periods he explains as due to repeated movements of the sea-level. On this view there would be, during a period of glaciation, no absolute change of climate, for the retreat of the sea would leave exposed new surfaces subjected to the same climatic conditions as those which prevailed near the sea-margin before the retreat. Such a hypothesis would, the author believes, make it easier to understand the persistence of plants and animals through the Ice Age than one which involves a general modification of climate over the whole surface. As an analogy to explain what he believes happened, he points out that if a "dint" is made in a metal basin containing water the water-level within the basin will alter, though

the volume of fluid remains the same. If the dint is then removed, the water returns to its former level. The causation of the changes in the shape of the floor of the ocean he would seek in the Tertiary mountain-building movements. He considers that a sinking of the sea level to the extent of 600 metres would explain the phenomena of the last glacial period.

In the second part of his paper Mr. Enquist goes on to discuss the general geographical consequences of such movements of the ocean floor, and the amount of evidence available to show that they occurred. If the land surface was greater in area during periods of glaciation than at present then surfaces now sunk beneath the sea should show signs of having been subjected to the same agents of erosion as existing land surfaces. As a proof that this has occurred he points to fiords and drowned valleys, whose existence is, of course, well known. Further, he believes that the evidence of movements of elevation and depression, furnished by coral islands, by the distribution of plants and animals, and so forth, support his views. It is obvious, however, that while such phenomena have always been relied upon by geologists to show that alterations in the relative height of sea and land do occur, they do not in themselves prove that the movements caused the Ice Age.

Doubtful Islands in the South Pacific.—In the course of the voyage of circumnavigation made recently by the ship *Carnegie* in lats. 50°-60° S., for the sake of studying terrestrial magnetism, a special search was made for two islands, or groups of islands, which have been charted in the South Pacific. The results, which were negative, are described in a note in the *Revue Générale des Sciences* for May 30 (cf. also the *Geographical Review* for April). The first group is that recorded by the captain of the ship *Nimrod*, who, in 1828, during the course of a voyage from Port Jackson to Rio de Janeiro, believed that he observed islands at a great distance in lat. 58° 5′ S. and long. 158° 5′ W. In 1831 Captain Biscoe sought for the islands, but was unable to find them. Owing to a change of wind, the *Carnegie* was unable to get nearer than 40 miles to the supposed position, so that the fact that nothing was observed of the group does not prove their non-existence. In regard to the other island, Dougherty Island, more definite information seemed to be available. This island was first recorded by the whaler *James Stewart*, in May 1841, the position given being lat. 59° 20′ S. and long. 120° 20′ W. In September 1859 the captain of the ship *Louise*, on voyage from Melbourne to St. John, New Brunswick, observed an island in lat 59° 21′ S. and long. 119° 7′ W., which was believed to be the same. In December 1915 the *Carnegie* passed within three miles of the supposed position, and continuous observation failed to disclose any trace of land. Two experiences met with on board the boat, however, illustrate the ease with which error may arise. On one occasion an unexpected cry of "Land ahead" rang out, and a dark, rocky island appeared. The ship was put about in order to approach the supposed island more closely, and as it was neared it presented the appearance of a snow-clad cliff. On a closer approach, however, the supposed island dissolved itself into an

iceberg, nearly a quarter of a mile long and about 225 feet in height, the cliff-like appearance being due to the way in which the light was reflected. On another occasion a mirage gave rise to the appearance of an extended land mass in the direction of Banks peninsula, from which the ship was then distant about 190 miles.

The 1 : 1,000,000 Map.—In his address at the anniversary meeting of the Royal Geographical Society in May last, Mr. Douglas Freshfield gave some interesting details in regard to the map of Europe and the Nearer East on the 1 : 1,000,000 scale. His address is published in the July issue of the *Geographical Journal*, and from it we learn that twenty-two sheets of the map have been compiled by the Society and reproduced and published by the Geographical Section of the General Staff: eighteen sheets have been compiled and are in process of reproduction, while other seventeen are in a more or less advanced state of preparation. The scope of the map has been extended northward to the North Cape and the new Russian port of Alexandrovsk, eastward to Baghdad and the Caspian, and southward to Cairo and the head of the Persian Gulf. The map has now established itself as the standard map for use in all the larger considerations which arise in the conduct of the war. Although meantime it has not been possible to issue layer-coloured sheets, yet, with the help of several ladies, coloured sets have been made and presented to the General Staffs of Great Britain, France, and Russia. Other special series of the map are in preparation, these including sheets to illustrate Mr. B. C. Wallis's study of the Distribution of Nationalities in Hungary, and others showing the history of boundaries in Europe during the last one hundred and thirty years. A general index to the names on the 1 : 1,000,000 maps has been begun, and many thousands of cards have been accumulated.

EDUCATIONAL.

Oxford Summer School of Geography.—A full programme of the vacation course in geography at Oxford (cf. p. 252) has now reached us. Dr. J. Scott Keltie is to deliver the opening address on August 3, his subject being "The Progress of Geography in the Last Half Century and its Present Position." The detailed programme for the two parts of the course is as follows:—

During the first part of the course (from August 4 to August 10 inclusive) there will be lectures or courses of lectures on the Oxford District, on Ordnance Maps, on Climate, on Egypt, Greece, Asia Minor, India, and Palestine, by members of the staff of the Oxford School of Geography and others, including Miss N. E. MacMunn (Demonstrator and Tutor in the Oxford School of Geography), Miss S. Nicholls (author of *Scenic Studies of the Bible Background*), etc., Professor Spenser Wilkinson, the Rev. F. R. Burrows (author of *The New Science*, formerly of Blackheath School), the Rev. E. C. Spicer (Oxford University Extension Lecturer and Lecturer in the Oxford School of Geography), Mr. P. M. Roxby (Lecturer in Geography in the University of Liverpool), Mr. W. G.

Kendrew (Lecturer in Meteorology in the Oxford School of Geography), and Mr. C. B. Fawcett (Lecturer at University College, Southampton). The classes meeting in the forenoon will be for the study of Elementary Practical Geography, Advanced Surveying, Land Forms, and the Geography of the Home Region, and those in the evening for Weather and Climate, and the Geography of the Holy Land.

In the second part of the course (August 11 to August 18) most of the lectures will deal with the Geography of Selected Areas in Europe, with Transport and Trade Routes, or with Methods of Geographical Study, and the lecturers will include Professor Grenville A. J. Cole (of the Dublin College of Science), Mr. J. Cossar (Lecturer at Glasgow and in the Oxford School of Geography), and Mr. H. O. Beckit (Acting Director of the Oxford School of Geography). The forenoon classes will study the Geography of Exploration, Economic Geography, and Elementary Surveying; and the evening classes the Regional Geography of Europe and Map Projections.

There will be during the course, weather permitting, at least one short and two long excursions to places of geographical interest near Oxford, and it is intended that there shall be several evening demonstrations or discussions, and one or more meetings of a social character, especially during the second week.

NEW BOOKS.

EUROPE.

The Slavs of the War Zone. By the Right Hon. W. F. Bailey, C.B. London: Chapman and Hall, 1916. *Price* 10*s.* 6*d. net.*

The author has collected in one volume the articles contributed by him to the *Fortnightly Review*, *Nineteenth Century*, and *Edinburgh Review*, and published them, revised and enlarged, with illustrations, an ethnographic map, and an index, the whole forming a very attractive contribution to one of the most puzzling questions of the day. Mr. Bailey writes in a graphic style, and his descriptions of the Slavs in their own homes are often wonderfully picturesque. In an introduction he distinguishes between the two groups of Slavs in Central Europe, the Northern comprising the Slavs of Russia, Poland, Ruthenia, Bohemia, and the Slovaks; while the Southern group comprises the so-called Jugo-Slavs, viz. Slovenes, Croats, and Serbs. He does not mention the Slavicised Bulgars. With the exception of the Russian, Serbian, and Bulgarian Slavs, all of these peoples live mainly in Austria-Hungary, where the Slavs comprise one half of the entire population, the other half being made of Germans (25 per cent.), Magyars (20 per cent.), and Rumanians (4 per cent.) "When the history of the origin of the present war," says the author, "comes to be written, it will probably be conceded that it was mainly due to the clash of interests between the Teutonic and Slav peoples." Germany regarded the "Slav races as low grade, and always exhibited towards them the hatred and contempt that dominant castes have for what they consider inferior, that is less masterful, peoples within their borders." With regard to Russia, however, Germany invariably viewed her with a certain contempt mingled with fear. She adopted towards her a policy of cajolery and intrigue.

Mr. Bailey sketches rapidly but effectively scenes in Galicia, Poland, and Austria, with vivid descriptions of Vienna and Budapest, of Fiume (the Hungarian

seaport), Croatia, Belgrade, Serajevo, and Life in the Balkans. He devotes a chapter to "A Nation in Retreat: Serbia's Agony, 1915," and denounces the cruelty with which the Serbians were destroyed or expelled from Serbia by their German, Austrian, and Bulgarian invaders. "These simple Serbian peasants were contented with their lot, happy when allowed to dwell undisturbed in their own land. They bore ill-will to none. They envied none. But to fulfil the purpose of a dominant and alien people it was necessary to hunt them down, to break their spirit. 'Civilisation' sent its licentious, brutal forces of 'frightfulness' to wreak upon them unspeakable atrocities, to perpetrate upon them all the horrors of carnage and lust. Hunted, famished, tortured, murdered, their corpses are left unburied to manure the land which they loved so well, the land which their unceasing toil made to blossom as the rose. They rot here on their devastated fields and hillsides. But better this, they think, than degradation and slavery under the Teutonic yoke."

AMERICA.

Cuba, Old and New. By ALBERT G. ROBINSON. London: Longmans, Green and Co., 1916. *Price 7s. 6d. net.*

This book, which is finely illustrated by photographs taken by the author, and has a good index but no map, is apparently intended primarily for visitors to the island, especially American visitors. Its contents are somewhat heterogeneous, and include a history of the discovery and settlement of the island, of the period of Spanish rule, and of the relations with the United States which culminated in the Spanish-American war, and finally in the withdrawal of the States and the establishment of the Cuban republic in 1902. Interspersed among these historical chapters are others on the geography of the island, on the excursions which may be made by the visitor, and on the products, with special reference to sugar and tobacco, the most important. The author is evidently well acquainted with Cuba, and his descriptions are fresh and interesting, but we take it that, on the whole, his personal investigations have been rather in connection with politics and commerce, and that his interest in geography or any branch of science is less. The treatment of the natural resources and probable lines of future development is somewhat sketchy, and it is curious in a book on Cuba to find no account of the inhabitants, who are, despite their descent, carefully distinguished from "Spaniards," that is presumably recent immigrants from Spain.

The account of the relations between Cuba and the States is, however, exceedingly interesting, and not without its lessons, in view of the problems which will arise at the Great Settlement for which we hope in the not too distant future. We shall devote the remainder of this notice to this subject, but cannot resist the temptation of first calling attention to a highly entertaining story of a "vein" of anthracite which was discovered by an energetic prospector, cropping out at intervals along the high road, in apparent defiance of all geological and mineralogical teaching. It was discovered eventually that the road marked the line of an abandoned narrow-gauge railway, and the anthracite had been dumped down at intervals in little heaps at the side for the use of the portable engine used in the construction of the road. It was excellent anthracite, but came from Pennsylvania!

We cannot of course follow in detail the story of the relations between the island and the government of the United States, but Mr. Robinson has no doubt that the assumption of responsibility for its welfare came not with the intervention of 1898, but by diplomatic acts dating more than seventy years before. With great frankness he states that "At no time in the entire experience did they [the Cubans] ask for intervention. That came as the result of a combination of

American wrath and American sympathy, and more in the interest of the United States than because of concern for the Cubans." But the Cubans took with entire seriousness the Teller amendment of April 20, 1898, which stated "That the United States hereby disclaims any disposition or intention to exercise sovereignty, jurisdiction, or control over said island except for the pacification thereof, and asserts its determination, when that is accomplished, to leave the government and control of the island to its people." They were therefore naturally considerably taken aback when, while their delegates were engaged in considering the question of the future relations between the island and the States, the Platt amendment was passed by the U.S.A. Senate. This amendment, which provides that the Cuban Government cannot borrow any important sums without the consent of the United States, goes on to say that the States "may exercise the right to intervene for the preservation of Cuban independence, the maintenance of a government adequate for the protection of life, property and individual liberty, and for discharging the obligations with respect to Cuba imposed by the Treaty of Paris on the United States." This amendment was bitterly opposed by the Cubans and was only accepted when it became apparent that the alternative to its acceptance was annexation. Mr. Robinson notes that there is still a considerable party in the States who regard annexation as inevitable at some future period.

The other important point in regard to the relations of the two republics was the Reciprocity Treaty. By means of it Cuba finds a market in the States for nearly all her sugar and about 60 per cent. of her tobacco and cigars, the two commodities representing about 90 per cent. of the total exports. In return Cuba gives the States a custom-house advantage of 20, 25, 30, and 40 per cent. in tariff rates. This is sufficient to ensure that Cuba buys in the American as against the European market many commodities such as food materials, coal, lumber, mineral oil, etc., and, in regard to many manufactured goods the tariff "is enough in some cases to give us a fair equality with European sellers, and in a few cases to give us a narrow margin of advantage over them. It does not give us enough to compel Cuban buyers to trade with us because of lower delivered prices." This fact is deeply resented by some Americans, who consider that the States should have a complete monopoly of the Cuban market. The facts are extremely interesting, and, as we have just said, are worth careful study at the present time. For fuller details reference should be made to the relevant sections of the book.

Mosquito Control in Panama: The Eradication of Malaria and Yellow Fever in Cuba and Panama. By Joseph A. Le Prince, C.E., A.M., and A. J. Orenstein, M.D. With an Introduction by L. O. Howard, LL.D. New York and London: G. P. Putnam's Sons, 1916. *Price* $2.50 *net.*

This book is divided into two unequal parts, two-thirds dealing with the anti-malaria campaign in Cuba and Panama, and the remainder with yellow fever there. A very brief study of its contents shows that this division indicates with some clearness the relative difficulty of the two problems. To reduce yellow fever in a tropical country to a minimum, or even to eradicate it in a given locality, is relatively an easy matter, while to keep down malaria is not only difficult, but demands ceaseless vigilance, and a constantly repeated outlay. The explanation is found in the characteristics of the mosquitoes which transmit the disease-producing organism in the two cases.

The mosquito which transmits yellow fever (formerly called *Stegomyia fasciata*, now known as *Aëdes calopus*) is an inhabitant of houses, and breeds there. Its favourite breeding-places are water-barrels, tanks, the earthenware jars used in Havana for storing the domestic water-supply, spouts, troughs, and gutters, as

well as household refuse capable of containing water, such as broken crockery, tins, etc., all such receptacles being classified by the sanitary inspectors as "water containers." In Panama and Colon, at the time when work on the canal was begun, there was no sewage system, and no water-supply apart from rain-water, which was collected in various receptacles, and peddled by watermen to the inhabitants. This supply was stored within the houses, and the jars and buckets were rarely emptied, fresh water being added as the supply diminished. These receptacles were not protected from the mosquitoes haunting the houses, and the habits of the larvae render them not very liable to detection. In distinction to the larvae of our common gnats in this country ("bloodworms"), who spend most of their time at the surface, the Aëdes larvae spend much of their time at the bottom of the water, and sink so rapidly when disturbed that all may remain in a few teaspoonfuls of water left in the bottom of a bucket. Thus in Panama and Colon, no less than in Havana, the inhabitants habitually bred mosquitoes in their houses and in the surrounding yards, etc. If these mosquitoes bite a patient suffering from yellow fever within the first three days of the disease, and, after an incubation period of twelve days, again bite a susceptible person, the latter acquires the disease.

Thus the disease may be attacked from two sides. In the first place, patients suffering from it must be kept rigorously enclosed in mosquito-proof rooms, to prevent the infection of fresh insects, and in the second, the presumably infected mosquitoes of the houses in which they have contracted the disease must be destroyed. The latter is easily done by fumigation, while the breeding can be minimised by a rigorous enforcement of the regulation that no water-container must be left unscreened in or near houses. Both in Havana and the Panama zone the beneficial effect of these measures was obvious almost at once, though, naturally enough, the native inhabitants were apt to resent the constant inspection of their water jars and barrels which their enforcement demanded. The result of the measures adopted was, as already stated, to show that yellow fever can be eradicated with comparative ease in any locality, the installation of a complete sewerage and water system being in itself a great factor in this, by doing away with the necessity for storing water in houses.

The case of malaria is far more complicated, and on reading the first section of the book one's mind is clouded with the doubt whether, under tropical conditions, except in special cases, even the most paternal of governments can keep up for an indefinite time the constant, laborious, and costly campaign necessary to reduce the numbers of the offending mosquitoes—members of the genus Anopheles in this case. The effect of the campaign in the Panama zone was to reduce the hospital sickness rate from malaria among employés from 82 per cent. in the year 1906 to 8 per cent. in the year 1913—an extraordinary reduction, but not of course entire success.

The difficulty in this case is that the mosquitoes will breed in stagnant or slowly-flowing water anywhere, even if this water form but the merest film on the surface. The adults fly considerable distances to attack man. Further, in Panama rain occurs frequently during eight months of the year, and even during the dry season the fact that the numerous streams dry up partially means that water-holes suitable for the larvae remain abundant in their beds. In the Panama region also the temperature remains throughout the year favourable to the development of the mosquito, and they can run through their larval stage in about eight days. Thus even such temporary accumulations of water as form in the hoof-marks of cattle in soft ground can act as breeding places.

The main methods of avoiding attack are of course rigorous care in the use of nets, screens, etc., at night, but in the Panama zone at least it is not true that

Anopheline mosquitoes only bite at night, for on one occasion, while investigating a large sheet of water near Gatun Dam, the observers were bitten in the open, and in full sunlight. The methods of diminishing the number of mosquitoes consist in reducing, so far as possible, by drainage and so on, the amount of standing water, especially near habitations, in oiling repeatedly surfaces which cannot be drained, and in correcting and clearing streams and ditches so that the water runs freely, and is not choked by vegetation; for slow-moving, weed-choked water is especially favourable to the larvae. The details given in the book make the work of the Panama Sanitary Department seem almost superhuman, and while expressing profound admiration for the task accomplished, and with full realisation of the special difficulties presented by the Canal Zone, we can only say that from the large point of view it does not seem to us that such tropical regions can be rendered malaria-free at what might be called a remunerative expenditure of time and trouble. There were of course special reasons why it was worth while to render this particular belt of tropical country reasonably healthy for the white man, at whatever cost. But, at least until the temperate zone is more densely peopled throughout than it is at present, or until anti-malaria measures have been simplified, we doubt whether large areas of the wet tropical belt can be rendered healthy for the white man. The Panama campaign has shown that the hold of the black upon the wet tropical belt could be loosened; it has not, we think, proved that his dominance there will be seriously contested by the white in the near future.

POLAR.

The Voyages of the "Morning." By Captain G. S. Doorly, R.N.R. London: Smith, Elder and Co., 1916. *Price* 6*s. net.*

This volume is a belated record of the relief of the *Discovery* in 1902-04. The *Morning* was the first relief ship, and in 1903 brought back news that the *Discovery* was firmly frozen in the ice in M'Murdo Sound. She returned to New Zealand to winter, and the next summer she was sent south again in company with the *Terra Nova*. In April 1904, the two ships returned to New Zealand with the *Discovery*. No volume has yet been written on the work of the *Morning*, so that this one, by her third officer, relates an unrecorded chapter in Antarctic history, and is a happy supplement to Captain Scott's *Voyage of the Discovery*.

There is no list of the men who took part in the expedition; some are mentioned incidentally, but the absence of a complete list severely impairs the value of the book. One special link the relief expedition had with Scotland was in the medical officer, Dr. George A. Davidson, a graduate of Edinburgh University.

The matter might easily have been expanded into a larger volume, but fortunately the author does not know the art of verbosity. He writes in an unaffected style, delightful in its continuous note of joy in his work and enthusiasm for the men with whom he sailed. There are several illustrations and a map. It is to be hoped that, despite the days of stress when it is published, this book will not be overlooked, for it is a fine record of adventurous and successful seamanship by a man who made light of difficulties, and never attempts to embroider with sensational details any situation, however perilous.

GENERAL.

The Year-book of Wireless Telegraphy and Telephony, 1916. London: The Wireless Press, Ltd. *Price* 3*s.* 6*d. net.*

This volume is somewhat increased in size as compared with the last issue, and has a number of illustrations, among them a pathetic plate showing wireless opera-

tors who were on duty on the *Falaba*, *Lusitania*, *Arabic*, and *Persia* respectively, at the time these boats were attacked. Among the most interesting events recorded for the year 1915 are the establishment of a wireless service between Spain and Italy, and Japan and the United States respectively, and the successful telephoning by wireless from Arlington, U.S.A., to Hawaii, a distance of nearly 5000 miles, and from Arlington to the Eiffel Tower, Paris, across the Atlantic. In addition to the technical articles and summaries a number of subjects of more general interest are discussed, in one of which some striking facts are given as to the care with which Germany prepared for the war by the establishment of wireless stations all over the world, but especially in South America. From a variety of causes the Germans were able to contract for the erection of wireless stations more cheaply than their competitors, but the stations so erected were usually of so complicated a nature that they could only be run by a German "wireless expert." The result was that "a very large number of the South American coast stations came under the charge of naturalised Germans, while in some cases the chief technical officials of the various Government telegraph administrations belong to the same nationality." Further, even after the outbreak of the war, the Germans established wireless stations on neutral territory, as *e.g.* on Easter Island, which is under the jurisdiction of Chile. It was these facts that enabled the German squadron to obtain its victory in the Pacific, for they constantly received information in regard to the movements of the British vessels, while the latter had no similar means of obtaining knowledge of theirs.

EDUCATIONAL.

Beginners' Regional Geography: Africa and Australasia. By J. B. Reynolds, B.A. London: A. and C. Black, 1916. *Price* 1*s.*

This booklet is copiously illustrated, both by maps and by black and white and coloured pictures. Many of the pictures will appeal strongly to those for whom they are intended, that is children of 8 to 11, but the text in many places seems to us too difficult for such scholars. Further, doubtless because of limitations of space, there are no comparisons between the unfamiliar conditions described and those which the child knows at home. We have found by experience that such statements as that "The climate of the Sahara is very hot and very dry—even in winter it is warm"—convey virtually nothing to young people even much over eleven, for their conception of dryness is a week or so without rain, and of heat a summer day in England or Scotland. The book is in the same series as *The Americas*, already reviewed here on p. 300, and we can only repeat, what has been already suggested there, that the teacher will require to supply much more than the text gives, and that the pictures are the really important part of the publication.

BOOKS RECEIVED.

Cuba, Old and New. By Albert G. Robinson. Illustrated. Demy 8vo. Pp. 264. *Price* 7*s.* 6*d. net.* London: Longmans, Green and Co., 1916.

Serbia in Light and Darkness. By Rev. Father Nicholai Velimirovic. Crown 8vo. Pp. xii + 147. *Price* 3*s.* 6*d. net.* London: Longmans, Green and Co., 1916.

Some Experiences in Hungary, August 1914 *to January* 1915. By Mina Macdonald. Crown 8vo. Pp. viii + 135. *Price* 3*s.* 6*d. net.* London: Longmans, Green and Co., 1916.

Anthropological Report on Sierra Leone. By Northcote W. Thomas, M.A., F.R.A.I., Government Anthropologist. Part I. Law and Custom of the Timne and Other Tribes. Pp. 196. Part II. Timne-English Dictionary. Pp. 139. Part III. Timne Grammar and Stories. Pp. 86. Demy 8vo. London: Harrison and Sons, 1916.

Specimens of Languages from Sierra Leone. By Northcote W. Thomas, M.A., F.R.A.I., Government Anthropologist. Fc. folio. Pp. 62. London: Harrison and Sons, 1916.

Japan, The New World-Power: Being a Detailed Account of the Progress and Rise of the Japanese Empire. By Robert P. Porter. With 7 coloured maps. Medium 8vo. Pp. xxiv+789. *Price* 6*s. net.* London: Humphrey Milford, 1915.

Past and Present at the English Lakes. By the Rev. H. D. Rawnsley, Canon of Carlisle. Crown 8vo. Pp. vi+283. *Price* 5*s. net.* Glasgow: J. MacLehose and Sons, 1916.

Mosquito Control in Panama: The Eradication of Malaria and Yellow Fever in Cuba and Panama. By Joseph A. Le Prince, C.E., A.M., Chief Sanitary Inspector, Isthmian Canal Commission, 1904-1914, and A. J. Orenstein, M.D., Assistant Chief Sanitary Inspector, Isthmian Canal Commission. With an Introduction by L. O. Howard, Ph.D., LL.D., Entomologist and Chief, Bureau of Entomology, United States Department of Agriculture. With 100 Illustrations. Demy 8vo. Pp. xvii+335. *Price* 10*s.* 6*d. net.* London: G. P. Putnam's Sons, 1916.

The Cruise of the Tomas Barrera: The Narrative of a Scientific Expedition to Western Cuba and the Colorados Reefs, with Observations on the Geology, Fauna and Flora of the Region. By John B. Henderson. With 36 Illustrations and Maps. Demy 8vo. Pp. ix+320. *Price* 12*s.* 6*d. net.* London: G. P. Putnam's Sons, 1916.

An Introductory Atlas of International Relations. By Henry Clay, M.A., and Arthur Greenwood, B.Sc. Maps by H. S. Hattin. Imperial 8vo. Pp. 74+47 maps. *Price* 1*s.* 6*d. net.* London: Headley Bros., 1916.

The German Peril and the Grand Alliance: How to Crush Prussian Militarism. By G. de Wesselitsky. Demy 8vo. Pp. 65. *Price* 1*s. net.* London: T. Fisher Unwin, Ltd., 1916.

The Statesman's Year-Book: Statistical and Historical Annual of the States of the World for the Year 1916. Edited by J. Scott Keltie, LL.D., assisted by M. Epstein, M.A., Ph.D. Crown 8vo. Pp. xliv+1560. *Price* 10*s.* 6*d. net.* London: Macmillan and Co., Ltd., 1916.

My Siberian Year. By M. A. Czaplicka, F.R.A.I., F.R.G.S. With 32 illustrations from photographs. Demy 8vo. Pp. xii+315. *Price* 10*s.* 6*d. net.* London: Mills and Boon, Ltd., 1916.

Survey of India. General Report, 1914-15. Prepared under the direction of Colonel Sir S. G. Burrard, K.C.S.I., R.E., F.R.S., Surveyor-General of India. Calcutta, 1916.

Papua. Annual Report, 1914-15. Papua: Commonwealth of Australia, 1916.

Report on the Administration of the United Provinces of Agra and Oudh, 1914-1915. Allahabad, 1916.

Some Early Exploring Expeditions and Travels in South Africa. By C. Graham Botha. Pp. 8. Capetown, 1916.

Publishers forwarding books for review will greatly oblige by marking the price *in clear figures, especially in the case of foreign books.*

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

GEOGRAPHY IN ITALY.

By George G. Chisholm, M.A., B.Sc.

We have received from the well-known and enterprising geographical firm, the Istituto Geografico d'Agostini at Novara, to whom geographers are indebted for a great deal of excellent geographical work, two text-books on geography [1] to which it will be worth while to give an unusually extended notice, as it will no doubt be of interest to geographers at home, but more particularly to teachers of geography, to see how the subject is viewed in another country. We have all the more reason for thinking this to be the case, since it would appear that the publication of these books is in response to a demand arising from the issue of new programmes of geographical education for the higher schools in Italy. That is expressly stated to be the case with regard to the first of the books noted below in a prefatory statement made by the publisher. Unfortunately, in this case, we have not the advantage of a preface by the author, inasmuch as at the time of publication he was so seriously ill as to be unable to undertake the final revision of the proofs or any other work in connection with the publication. It is to this publisher's preface accordingly that we must look for a statement as to the purpose and nature of the work. One statement in this preface we are glad to be able to confirm, that more particularly in that part of the book which makes up the greater part of the volume, the author both instructs and delights us. The work, that is to say, is written in an attractive style, and, as the publisher states, every paragraph or section giving an

(1) Paolo Revelli: *Corso di Geografia per le Ginnasi e Medie*. Volume primo: *l'Italia*. Prezzo L. 1.50.

(2) Dottor Dino Muratore: *Corso Pratico di Geografia Moderna per le Scuole Medie di 1° Grado*. Volume primo: *Geografia generale; l'Europa; l'Italia*. Prezzo L. 1.80. Volume secondo: *l'Europa in particolare*. Prezzo L. 1.80. Novara, 1905.

account of a region or sub-region of Italy is written in such a manner as to give us a clear and definite idea of the area described.

With regard to the arrangement of the volume the publisher tells us that the author has not forgotten either the general "instructions" or the special programmes above referred to, but, at the same time, he has borne in mind one of the final observations to be found in both, namely, that as there is no method which can be considered as absolutely good, so there can be no programme equally good for all teachers, and for that reason in the treatment of his subject he has placed first that which in the programme is placed last, namely, instruction with regard to the use of geographical and topographical maps. This arrangement we cannot but approve as logical, whatever reasons there may be for postponing this rather difficult part of the subject to the latest stage of the course.

The general introduction devoted to this subject occupies 53 out of the 262 pages of the text. It begins with an exposition of the difficulty of representing the surface of the earth on a map, gives an illustration of the well-known T-maps showing the conceptions of the middle ages, furnishes us with a page of illustrations showing a map of Italy as drawn at six widely separate dates; proceeds to consider the methods of ascertaining the facts which are ultimately set down in maps under the heading of "Representation of the Surface of the Earth upon a Globe": furnishes us with particulars of the dimensions of the earth according to the calculations of Bessel, and then passes on to that subject which all teachers of geography find it so difficult to explain for purposes of geography only, namely, that of projections.

The subject of projections is of course essential for the mathematician, who delights in devising ever new projections, whether useful or otherwise. But while it is an essential one for the mathematician, it is one which the geographer has to face, and one which cannot even be overlooked in ordinary courses of geography, in order that the learner may have some idea of the necessity for adopting different projections for different purposes. The projections that are really required by the geographer are not in fact very numerous, and as it seems to us, more are in actual use than there is any need for. In any case, the teacher of geography is constantly endeavouring to lay before students, in whom it is impossible to presume any advanced knowledge of mathematics, some such account of the more familiar projections as will serve the purpose already indicated. This, then, is attempted by the author of the *Corso di Geografia*, but we can hardly say with complete success, and we have all the less hesitation in giving a few hints as to how, in our view, the treatment might be improved since the publisher, at the close of his preface, makes a special appeal for suggestions of amendments, particularly in view of the circumstances in which the book was issued, and assures us of his desire to publish an improved definitive edition at no distant date. We may note as one of the results of the, in our opinion, quite laudable attempt to discuss the subject of projections so far as possible without mathematics, a tendency to describe

projections by properties which may indeed characterise them, but certainly do not define them. For example, the author, referring to the azimuthal equivalent projection, a really useful one of which readers of this *Magazine* have examples in the maps illustrating some of the late Sir John Murray's papers in vols. ii., iii., and iv. (1886, 1887, 1888), and the principle of which is stated on p. 549 of vol. ii., describes it as one with curved meridians and with parallels whose curvature goes on increasing with the distance from the equator. Well, that may be quite true of this projection, but it is equally true of Bonne's projection, which is so frequently used for the map of Europe, a projection referred to by the author, although not expressly named, on the same page, 23.

The only projections described by the author at any length are Mercator's, the simple conic, and the polyconic, and it can hardly be said that his description of the first two at least quite satisfies the conditions that the geographer would like to see fulfilled. What the geographer wants to have some idea of with regard to any projection, is the merit or merits that recommend it for certain purposes, and the defects that are inevitably associated with it. As to his account of Mercator, one may note to begin with that his description of its construction is hardly so full as it might be made even without going into mathematics. He tells us that the parallels become further and further apart from one another as they recede from the equator, and that in order to compensate the excessive extension in the length of those parallels resulting from the construction of a simple cylindrical projection. It would have been well to state more particularly the exact principle of this compensation. He points out one advantage resulting from this method of projection, but he gives us no hint whatever as to why this projection is used at all. He tells us that it faithfully reproduces the form of every region, that is to say, it faithfully shows us the relations in the different parts of the outline (so far as that can be done consistently with a steady increase of scale polewards). But he does not point out that it is the fact that this is the only projection that gives us all compass bearings by means of straight lines which gives this projection a peculiar value in navigation. Then, again, in his account of the construction of a map of Europe in the simple conic projection, he once more attempts to avoid mathematics as much as possible. He tells us that the parallel 50 will be taken as the middle parallel for such a map, and it is accordingly necessary to know the metric value of a radius of that parallel, according to the scale of the map adopted, and then to describe from a centre on a prolongation of the middle meridian of the map a circle corresponding to that radius. Now, this account will certainly mislead students. What they will be sure to understand as a radius of the circle indicated, is the radius of the small circle described by the parallel of 50 on the globe to which the map corresponds, that is to say, the co-sine of the latitude on that globe, whereas what he means is that we must ascertain the metrical value of the radius required for the drawing of an arc of a circle on a flat map to give the required parallel, and that radius is the co-tangent of the parallel on the corresponding globe. Mr. Revelli neither tells us precisely what the

nature of the fault of this projection is, nor what are its countervailing merits.

One other improvement in this part of the work we would suggest, namely, in the account that the author gives of contour lines. In this case it is an emendation which it would be very easy to make, but which, nevertheless, we think should prove useful. After stating the nature of contour lines, the author tells us, as is generally done also in English books upon the same subject, that where we have contours representing the same interval of altitude we must infer that the slope is gentle or rapid according as the contours are relatively far apart or relatively near one another. What ought to be stated here is that the average slope may be thus deduced, for it is very important that learners more particularly should be expressly informed that contours give no information whatsoever as to the nature of the slope between any two successive contours. That fact, we may mention, is expressly recognised in the illustration of contours furnished upon page 30 of the work now under consideration, where, in a section representing the outline along a line drawn through a corresponding map, various slopes are drawn between contours of the same interval, but all consistently with the form of those contours on the map. The importance of this consideration may be realised by all who reflect that where, for example, the contours are drawn at intervals of 100 metres, a hill rising to the height of 90 metres or more above the surface of a road from which it was viewed, might have no indication whatever on a map on which the surface features were represented solely by contours with or without layering.

The greater part of the portion of the volume devoted to Italy is taken up with descriptions of the various "compartments," that is to say, the old provinces of Tuscany, the Marches, and so forth, each of these being described in separate paragraphs, with such headings as name, limits, area and population, relief, hydrographic and economic conditions, and the principal towns. This arrangement is undoubtedly on the whole appropriate to the actual physical conditions of Italy, but, at the same time, it involves, as a necessary supplement, the chapter devoted to Italy as a whole, and most people, we think, would have preferred to have found this chapter, the eighth, entitled, "Italy in General," at the beginning instead of at the end of the sections devoted to the several regions. One feels disposed to ask whether this relegating of the general chapter to the end has been in any degree the cause of the neglect of points which one would have liked to see considered. For example, in paragraph 111 in this chapter we are told that the Po may be called one of the chief rivers of Europe, not because of its length or the extent of its basin, but on account of its discharge, which on the average is at its mouth about 1700 cubic metres per second. A river of such volume flowing through a level plain might fairly be expected to be an important waterway. Yet we know that it is not. One would like to know why. In paragraph 117 the means of communication are considered, and one might have expected the answer there, but it is not. Such details are reserved for the regional part of

the book, but to none of these is the consideration of this subject appropriate.

The ninth chapter is entitled "The Italian Nation and the Italian State," and in it emphasis is laid, as is generally done in Italy, upon the distinction between the physical Italian region and the political Italian region, the former being defined as that which is bounded on the north by the water-parting of the Alps; on the east by the water-parting of the Adriatic and Ionian Seas; on the south by the Sicilian-African Sea and the Tunisian Channel, extending through the Pelagian Islands; on the west by the Tunisian Channel and then through the Mediterranean to the lines running through low country from Varo-Tinea, and then along the water-parting of the Cottian and Graian Alps. But the author adds, page 229, that although these lines are natural they do not comprise a physical region properly so-called, limiting this name to those regions characterised by unity of origin and of morphology, such as the Alpine region, whose southern part corresponds to the northern part of the area to which tradition assigns the name of "Physical Italian Region."

Finally, with regard to this book we would call attention to one point that may be of use, even to those who do not read Italian, namely, the fact that the tonic accent of proper names is uniformly given according to a definite principle. For this purpose a grave accent is used in all words where the stress falls upon the antepenultimate or an earlier syllable, it being stated that where there is no printed accent the accented syllable is the penultimate. Thus where we find Pavia written without any accent, the pronunciation is not as we in this country are apt to give it with the accent upon the first syllable, but with the accent upon the second syllable to make it rhyme say with "idea." It may also be added for the sake of those who know Italian, and who are apt to take a grave as indicating the quality vowel sound in the case of E and O, indicating the so called open sound of those letters, that it is never so used in this book. It is the accent of stress that is solely indicated thereby.

Turning now to the other work, we have to note first that one is apt to be a little puzzled as to what is meant by calling it a *Practical Course of Modern Geography*. One might perhaps have looked at it with a great deal more interest if it had really been a practical geography, but the work is not of that nature at all. It does not give us any hints of the work to be done with one's hands or eyes in the learning of geography, and no indication is given by the author himself as to what he means in so designating the work. We may perhaps collect what is meant by calling it "Practical," from a statement in the publisher's preface to Mr. Revelli's work, designed for the modern gymnasium, "which has a formative as well as a merely informative function." The author, we are told, was prevented in issuing a book designed for the gymnasium from giving to his introductory book too practical and professional a direction, and we may assume, therefore, that the term "practical" relates to the fulness of detail given under the heads of general, physical, mathematical, and other aspects of geography.

The work has undoubtedly some useful features, among which, for example, we would call special attention to the plates on pp. 48 and 49 of vol. i., showing a considerable number of profiles of portions of Italian railways in such a manner that they may almost be allowed to speak for themselves even when examined by those who do not understand Italian, though we may here state that the figures on the left of each profile give the distances in kilometres from the starting point of the section, those to the right the altitude in metres above sea-level.

But while recognising the good points in the work we cannot admit that the boast of the preface (p. iv) that the exposition of the subject is "rigorously scientific" is borne out in the body of the book. Is it rigorously scientific to say (i. p. 12) that there are two points of the compass easy to find, the east and the west, the former at or near where the sun seems to rise every morning, the latter at or near that at which it seems to set every evening? That is, no doubt, more nearly true for Novara than for Edinburgh, still it is rather wide of the truth sometimes even at Novara in spite of the illustration (Fig. 2, on p. 11). Is it again rigorously scientific to say (p. 14) that the pole-star indicates exactly (*appunto*) the north? Or still more strangely that the Southern Cross indicates exactly the south? To say (p. 62) that the level of the sea represents a surface every point in which is at the same distance from the centre of the earth? That the surface water of the sea is always a little warmer than the superincumbent air (p. 70)? That the deep waters of the ocean are salter than the surface waters (p. 71)? That places close to the sea have mild winters (p. 115: 'New York, Vladivostok)?

In the second volume one would have expected in a "practical" geography to see more attention paid to the navigability of rivers, but though this is not entirely neglected the treatment of the subject cannot be considered adequate even for the scope of the work. It is surely remarkable to find no mention either on p. 311 or p. 322 of the rapids of the Dnieper, than which it would be difficult to find a more important feature in the geography of Russia, especially as related to its history. One would like to see some exposition of the principles on which the map of the physico-ethnographical regions of Europe between pp. vi and vii of vol. ii. is drawn up.

SOME JAPANESE CITIES.[1]

"THE steep slopes of Dai Nippon, fertile only under spade tillage, will for ever insure Japan the persistence of a numerous peasantry. For geological and geographical reasons, as from national motives, therefore, Japan will probably never sacrifice its farmer to its industrial class, as England has done."[2] While this is doubtless true as a general state-

[1] *Japan, the new World Power*. By Robert P. Porter. London: Oxford University Press, 1915. Price 6s. net.

[2] *Influences of Geographic Environment* (E. C. Semple), p. 557.

ment, the analysis of the population statistics of Japan shows a steadily increasing percentage of town-dwellers. In 1894 nearly 16 per cent. of the people lived in towns of over 10,000 inhabitants; in 1908 (census year) this percentage had risen to nearly 25; the corresponding figures from the 1913 census are not yet available, but Mr. Porter anticipates that 30 per cent. of the population will be found in urban districts.[1] From the returns in the *Statesman's Year Book* for 1916 (in which some 1913 census results appear) we find in Japan thirty-five cities with a population of over 50,000, *i.e.* containing over 14 per cent. of the total population.[2]

This is one reason why we have decided to treat of Japanese cities, but several other considerations led us to the same conclusion. Professor K. Oseki has given us recently articles dealing with the Economic Geography of Japan and with the Japanese Alps,[3] while in our July issue of the present year we have an account of mountaineering in Japan. Moreover, Mr. Porter devotes separate chapters to the larger cities, on which we may base our remarks. Finally, Japanese cities illustrate the course of Japan's history from both economic and political standpoints.

Few countries can boast of so many capital cities as Japan. This is explained by the superstitious dread in ancient days of any place in which a person had died. Hence, on an Emperor's decease his successor founded a new capital. Thus Japan has had sixty capitals, most of them situated between Lake Biwa and the Inland Sea; but now they are mere villages or only empty names.[4] Among them, however, is Kyoto, which benefited by the desire, founded on an advancing civilisation, for a more settled centre of government. The Court was established there in 794 A.D., and with few interruptions remained there till the great revolution of 1868. Even to-day it ranks as a capital city under the name Saikyo (Western Capital), by which it is distinguished from Tokyo (Eastern Capital).

It is by its old name that the city is best known to the British people. Kyoto, the Athens of Japan, "from time immemorial the centre of learning and literature, where the most classic form of speech is current,"[5] is a superbly situated city. Japan is a mountainous country, with few plains. Indeed, there are only two delta-plains that may be described as large. These two plains contain the three largest cities of the country. Kyoto, the smallest of the three, has now over half a million inhabitants.[6] It lies in the northern part of the plain of Yamashiro, stretching along the banks of the Kamo river, west to the river Katsura, and south to their confluence with the Yodo river. Around are well-wooded mountain slopes, "decked with gay shrines and temple gates." Although the mountains shut it off from Lake Biwa, it is con-

[1] Porter, p. 137.

[2] The corresponding figures for the United Kingdom (1911 Census) are ninety-two cities with 40 per cent. of the total population.

[3] *S.G.M.*, 1915.

[4] *Things Japanese* (B. H. Chamberlain), p. 79.

[5] Stanford's *Compendium of Geography* (Asia), vol. i. p. 499.

[6] Census (1913), 509,380.

nected with that fine sheet of water by road, canal, and rail. The city was laid out on what we know now as the American method, and the plan given in Rein [1] shows the main but narrow streets running east to the bridges over the Kamo, crossed at right angles by other streets stretching to the city limits. In the heat of summer the populace enjoys the cool of the evenings along the banks of the clear Kamo-gawa; or the bracing mountain air attracts the people to the hills, for though Kyoto is about twenty miles from the sea, it is situated only 162 feet above sea-level.

Kyoto is the "City of Tranquillity," where one can most easily imagine one's self in Old Japan. Yet it is a city of electric cars and lighting, a railway junction, and an industrial centre. The principal manufactures are artistic silk embroideries, cord-knitting, lace-work; ceramics; fine lacquer work; fans of better quality; metal-working; cloisonné enamels; dolls and toys, etc. These are typically Japanese goods, and "it is safe to assert that the best quality in nearly all of these lines of small but artistic industries will be found to be of Kyoto origin." [2]

For over a thousand years Kyoto was the recognised capital of Japan. There the Emperor lived his inactive life in godlike seclusion, while the Empire was ruled and administered by royal or non-royal families. The mountainous nature of the country, which, as in Scotland, favoured the development of a clan system, was not adapted to centralised government. Thus we find a delegated and decentralised form of rule. At the time of the founding of Kyoto the Fujiwara family was supreme. The Fujiwara were the uncontrolled agents of the Emperor: they not only chose the Empresses from among the ladies of their house and thus moulded the royal family to their will, but also frequently induced the reigning sovereign to abdicate in early manhood in order to maintain their power by a series of minorities in the imperial line. Such influence could be maintained only by residence in the capital while their provinces were ruled and their armies led by substitutes. The successful warriors in the fighting against the Ainu of the marches were granted the conquered land free of taxation. This they in turn offered on easy terms to the peasants of the taxed districts who were ready to support their new landlords.

"While the later generations of the Fujiwara were, in the ease and luxury of the Court at Kioto, sinking into the condition of idle and incapable voluptuaries," [3] one of the military generals, Yoritomo (1192-1198), made himself virtually master of the empire, fixed his headquarters at Kamakura with the title of Sei-i-tai Shogun (barbarian-subduing generalissimo), and obtained a commission from the Emperor to reorganise Japan. This reconstruction took the form of a military feudalism, with the Shogun as overlord; and the civilians, though subordinate in all matters of administration to the Shogun and his officials, enjoyed a period of peace. This stage marks the beginning of the end of Kyoto's position as capital, for Kamakura (about thirty miles from

[1] *Japan*, p. 468. [2] Porter, p. 427.
[3] *The Evolution of New Japan* (J. H. Longford), p. 4.

Tokyo) had become the *de facto* centre of government. This dual system of nominal rule at Kyoto and virtual government at Kamakura lasted till 1868. "At Kyoto there was always the Emperor, the legitimate sovereign, the acknowledged source of all authority and the sole fountain of honour, surrounded by a small retinue of courtiers, who were known as Kuge, many of whom sprang from the Imperial family, and all of whom claimed an origin and descent that were only less illustrious than those of the Emperor. Both Emperor and court were entirely dependent on the Shoguns for their means of support, which were for many long centuries provided with such parsimony that all were practically sunk in abject poverty. On the other side, the Shogun's courts, first at Kamakura and afterwards at Yedo, with an interval between the two at Kyoto, in the very shadow of the Emperor's own palace, were maintained in the utmost imperial splendour; the national executive was entirely in the hands of the Shoguns and their ministers, and all the land in the provinces was parcelled among feudal lords—the *daimio*—the majority of whom sprang from soldiers of fortune, who were rewarded by successive dynasties of the Shoguns with the grant of large estates, the spoils of almost unceasing civil war."[1] The later part of Kyoto's history is best told in connection with that of Tokyo, and will be described in the story of the present capital.

Kyoto is an inland city; but an island country, like our own, has its most important cities situated round its coastline. They are generally the outlets for the most productive areas, and the inlets for the commodities necessary for the population that these areas demand for their development. The great seaports of Japan are for the most part new cities that have grown up since 1868, when Japan emerged from her long period of seclusion, and entered into competition with the world at large.[2]

At the delta-mouth of the Yodo river is Osaka, the port of Kyoto. This city is intersected with canals from the river, and is the Venice of Japan. It was the centre where the *daimio*[3] stored his grain: and in the days of small boats could easily market its surplus products. Thus Osaka became a grain centre and the focus of industrial activity. With the fall of the *daimio* the city lost its main source of wealth, and had to start its career afresh. An impetus was given by the establishment of the Imperial mint under British superintendence (1868-1872).[4] It is, however, owing to the introduction of western industries, carried on by western methods, that Osaka occupies the proud position of second city.

[1] *The Evolution of New Japan*, J. H. Longford, p. 6.

[2] "Up to the beginning of the seventeenth century Japan had exploited her advantageous location and her richly indented coast to develop a maritime trade which extended from Kamchatka to India; but in 1624 an imperial order withdrew every Japanese vessel from the high seas, and for over two hundred years robbed her busy littoral of all its historical significance."—E. C. Semple, *op. cit.*, p. 285.

"The fisheries, nevertheless, kept alive that intimacy with the sea, and preserved the nautical efficiency that was destined to be a decisive factor in the development of awakened Japan."—*Ibid.*, p. 332.

[3] The *daimio* were the territorial lords or barons of feudal Japan.

[4] The last of the British employés left in 1889.— *Things Japanese*, p. 108.

Its population of nearly a million and a half[1] "ply their various trades alongside the avenues of traffic, and even in boats on the canals. Now you pass through a long street given over to pottery and porcelain; next through one devoted to umbrellas and fans. There are emporiums of cotton fabrics, of rugs, of brushes, of leather goods, of bronze and metal work, of provisions, and of clothing.

"Methods and implements are as varied as are the occupations. Here are men with their bronze skin bare, save for a breech-cloth round the loins, pounding rice with a long wooden pole. Next door a dozen operatives are making garments with the latest American sewing-machines."[2] Osaka is indeed the city of contrasts. "You may within a few minutes view in operation the oldest and most primitive spinning-mill and the most intricate modern Jacquard machine."[3] Osaka has all sorts of industries; in fact, almost every industry is represented there, though most are worked only on a small scale. From one of the chief manufactures it has earned the title of "the Manchester of Japan." Cotton yarns and cloth are its most important exports in its great trade with China, Korea, and Kwantung. Red-brick cotton mills are built after the fashion of those of our country, but do not exceed two stories in height. This feature, common to all Japanese buildings (which are mostly of wood) is due to the prevalence of earthquakes, which have frequently been destructive in the country, either directly by destroying buildings, indirectly by causing fires through the overturning of the *hibachi*, or by a combination of these calamities.

The great fire in Osaka (1909) has led to municipal improvements in the widening of streets, better house-building and housing improvements. Trade has necessitated harbour improvements: land has been reclaimed, and stone breakwaters built. But Osaka is not a natural harbour like Kobe: it is too shallow to allow large ocean-going vessels to enter, and its trade passes very largely through Kobe, which lies an hour's rail run to the west. Still it has a large sea-borne traffic; it is Japan's third sea-port,[4] with rather less than one-quarter of the total trade of either Yokohama or Kobe.

[1] Census (1913), 1,395,823. [2] Porter, p. 110. [3] *Ib.*

[4] The Greater Seaports.

(From the "*Times*" *Japanese Supplement*, July 15, 1916.)

(Figures in pounds sterling, one pound for 10 yen.)

	1913.		1915.	
	Exports.	Imports.	Exports.	Imports.
Yokohama,	£31,682,139	£23,510,210	£30,595,359	£14,034,597
Kobe,	17,047,004	34,660,898	19,759,783	26,921,640
Osaka,	7,345,245	4,167,553	9,382,264	5,061,095
Moji,	2,089,581	3,733,407	1,860,438	2,320,697
Yokkaichi,	433,400	1,984,840	310,149	1,731,929
Nagasaki,	474,562	1,613,690	463,967	782,952

Kobe, twenty miles west of Osaka, with which it is connected by electric tram, is a new town, magnificently situated on its deep, safe harbour.[1] As has been indicated, Kobe and Osaka serve the same hinderland, the precedence of the former being almost entirely due to the superiority of its harbour. The trade of the city has been important since the middle of the sixteenth century, but the modern advance dates only from 1867, when Hyogo, now practically a suburb of Kobe, was opened to foreign trade. The growth of Kobe's foreign trade may be read in the following figures[2]:—

	Value of Exports and Imports.		Value of Exports and Imports.
1878	£1,253,150	1909	£28,484,133
1888	4,297,200	1910	36,124,382
1898	19,825,300	1913[3]	51,707,902
1908	24,505,200	1915[3]	46,681,423

Kobe now controls about 38 per cent. of Japan's foreign trade, and with a rich industrial hinderland still growing in productive capacity, and increasing commercial relationships with China, Manchuria, and Korea, may ultimately become the premier port of Japan. "Several years ago the Government found that the rapid development of the trade of Kobe demanded improved harbour facilities, so harbour works were authorised and started, such as the connection of land and sea transport, the building of a number of quays, the reclaiming of a large area of ground for warehouses and wharves. These improvements, which are nearing completion, coupled with the opening of the Panama Canal and the central situation of Kobe with regard to the Asiatic trade, will still further strengthen the position of Kobe in years to come."[4] Meantime Kobe holds the first place as an import centre, its imports exceeding in value those of Yokohama by over £11,000,000 (1913), a result due to the demand for raw materials, such as cotton, in the hinderland.

Kobe is a manufacturing centre of some importance. "Her ship-building and repairing dockyards employ some three thousand hands, and in the case of the Mitsu Bishi firm, are in connection with shipbuilding establishments at Nagasaki. The Kanegafuchi spinning-works, boasting the most model organisation in Japan, are here: also the Kobe steel-works, and a variety of other important manufacturing and industrial undertakings."[5] Thus Kobe is more than a merely commercial city, and supports a population of nearly half a million.[6]

We left the Shogun established at Kamakura, on the great plain of Kwanto, which is watered by the river Sumida. "Kamakura, taken by storm and burnt to the ground in 1455, and again in 1526, gradually lost its importance,"[7] and its former area is now largely covered with woods and rice-fields. The great Iyeyasu made the little village of Yedo

[1] Rein's *Japan*, p. 473.
[2] Porter, p. 134.
[3] "*Times*" *Japanese Supplement*, July 15, 1916.
[4] "*Times*" *Japanese Supplement*, July 15, 1916.
[5] Porter, p. 135.
[6] Census (1915), 442,187.
[7] *Things Japanese*, p. 80.

his place of residence in 1598, and developed the region which was to become the seat of modern Japanese power.

Meanwhile Japan had reversed her foreign policy. In 1624 foreigners were expelled and foreign trade came to an end. Such drastic measures are to be traced to the behaviour of the foreigners in the country: "the Jesuits were quarrelling with the Franciscans, the Portuguese traders with the Spaniards, and the Dutch, who were Protestants, with all Europeans, lay and clerical."[1] Japan had entered on her two hundred years' sleep, from which she was not awakened till the mission of Commodore Perry from the United States in 1853.

The causes of this attempt to open diplomatic relations with Japan are closely connected with the development of the Pacific border of the United States. "A large whaling trade had grown up in the Pacific: American sailors were cast away from time to time in Japanese waters: and it was intolerable that their repatriation should be attended with complications."[2] The Opium War of 1840 had opened Chinese ports to foreign traders, and American vessels required a coaling station in Japan. California was yielding her large supplies of gold to an increasing number of settlers, who "resolved to force their acquaintance upon Japan."

On the west Russia was pushing her influence to the Pacific, where Japanese interests were involved. A Russian raid on Sakhalin convinced Japan that she could no longer maintain her seclusion, and she began almost feverishly to prepare for the maintenance of her independence.

Perry landed at Yedo and laid his country's proposals before the Japanese. The result was the first commercial treaty with a foreign Power. Japan undertook "to accord kind treatment to shipwrecked sailors: to permit foreign vessels to obtain stores and provisions within her territory, and to allow American ships to anchor in the ports at Shimoda and Hakodate."[3] Similar treaties were signed by the Shogun with England, Russia, and the Netherlands.

These treaties were unpopular with the Emperor's party, which initiated an "Expel the foreigner" movement. This led to naval demonstrations at Shimonoseki by British, French, Dutch, and Americans, and at Kagoshima by the British. "In the face of the Kagoshima bombardment and the Shimonoseki expedition no Japanese subject could retain any faith in his country's ability to oppose Occidentals by force. Thus the year 1863 was memorable in Japan's history. It saw the 'barbarian-expelling' agitation deprived of the Emperor's sanction: it saw the two principal clans, Satsuma and Choshu, convinced of their country's impotence to defy the Occident: it saw the nation almost fully roused to the disintegrating effects of the feudal system; and it saw the traditional antipathy to foreigners beginning to be exchanged for a desire to study their civilisation and to adopt its best features."[4]

These events led to the recognition of the Emperor and the downfall

[1] Porter, p. 45.
[2] Porter, p. 62.
[3] Porter, p. 65.
[4] *Encycl. Brit.*, xv. p. 239, quoted, Porter, p. 71.

of the Shogun.[1] Mutsu-hito inaugurated the new era by receiving in 1868 a number of foreign diplomatists; shortly afterwards he removed his court to Yedo, which was renamed Tokyo. This change of capital corresponds with the change in Japan's policy. Kyoto, an inland city, was the capital under a narrow home policy; Tokyo, on the coast, marked the adoption of the broad foreign policy of an awakened Japan.

But Tokyo did not derive any immediate benefit from the change. The abolition of feudalism brought greater ruin to the city in a short time than fires and earthquakes could have done. "For, with the fall of the Shogunate, with the disappearance of the fiefs, the mansions erected by the feudatories in Yedo were demolished, and the noble parks in which they stood, parks created by the combined efforts of art and nature working through three centuries, were, according to one historian, with very few exceptions 'literally torn to pieces, so that the places they had adorned became vacant and desolate regions: blots breaking the continuity of the populous city.'"[2]

This was only an inter-period, for the new government had posts to fill. Hence Tokyo benefited by a friendly invasion of officials and would-be officials. There are now over two million inhabitants[3] in the capital, which covers an area of nearly twenty-nine square miles. As in other Japanese cities the streets are narrow and the houses only two stories high. Yet there are a hundred miles of electric tramways: and with houses of brick and stone and factory chimneys, Tokyo is fast losing the appearance of a Japanese city and becoming the amorphous mass that all modern cities tend to become. It is very largely a commercial city, though it is not an important seaport—only vessels of light draught can enter the river: some new textile factories have been established, and there is a large army of officials, professional people and those engaged in personal service.

The city "is excellently policed and fairly well lighted, has a sufficient water supply, and a public school system that will rank with those of most European cities."[4] But the drainage system leaves room for improvement, and the streets are bad. The former drawback may explain a remark of Professor Chamberlain,—"With so much to appeal to the eye, Tokyo has not a little that appeals to the nose"[5]: for the latter a "long-suffering public, who pursue their weary task of grinding in the rough pebbles, the scattering of which over the highway constitutes the municipality's sole function as a roadmaker,"[6] is blamed, as are also the monsoon rains which turn the roads into quagmires.

The jinrikisha, said to have been invented by an American, and humorously described by another as the "Pull-man car," was introduced to suit the narrow streets, but in Tokyo at least surface tramways and elevated railways are rapidly usurping its place in public favour.

Before leaving the extensive capital of the Japanese Empire with its

[1] It was well for Japan that internal troubles engaged the attention of Europe and America at this period.

[2] Porter, p. 398. [3] Census (1913), 2,050,126. [4] Porter, p. 402.

[5] *Things Japanese*, p. 51 [6] Porter, p. 403

sea of houses rising from the flat shore of Yedo Bay where the troubled waters of the Sumida mingle with those of the sea[1]—but where a new harbour project is under discussion, and reclamation has begun[2]—we may quote Professor Longford's description of Tokyo as it is to-day. "Tokyo of the present day has all the amenities of the London of George V. It is a more comfortable, convenient, safe and healthy place in which to live, but all that made Yedo so picturesque has gone. Only one feature of its mediæval and feudal splendour has been preserved. The deep moats, massive walls and turf-clad glacis that encircled the palace of the Shogun still surround the palace of the Emperor and have lost none of their grandeur. The pine and cherry trees still line the moat edges and the walls, and myriads of waterfowl still find a sanctuary in the moats. Everything else is gone. Even the parks have been disfigured by architectural monstrosities in glaringly red bricks, and the son of the stately silk-robed samurai now hurries, in a tweed suit and a felt hat, to his desk in a bank in a noisy, crowded, electric tram-car. At night the main streets are as brilliant, populous, noisy and safe as Piccadilly; they are entirely exempt from Piccadilly's plague spot in that there is no open display of female vice, and the danger that confronts the peaceful pedestrian is no longer the sword of the samurai but the motor of the road-hog."[3]

Yokohama, the outlet for Tokyo and the first seaport of Japan, lies south of the capital, with a spacious harbour on the west of Yedo Bay. Behind the city rises a low range of hills, while farther west Fujiyama stands out boldly. "A long, low-lying city, with a background of hills guarded by the bluff and ridge of Nogo—such is Yokohama from the sea."[4]

Nearness to the capital has undoubtedly made Yokohama the supreme port; but as the outlet of the Kwanto plain and northern Honshiu, and inlet for the great population of its hinderland, with which it is now well connected, it would have become great in any case. It is chiefly as an export centre that Yokohama is pre-eminent, but when we consider that it handles practically the whole of Japan's silk export, and that silk is by far the most valuable Japanese export, we can understand better this pre-eminence. It is shown in the following table[5]:—

	Imports.	Exports.	Total.
1908	£15,128,800	£19,080,500	£34,209,300
1909	13,100,000	20,516,000	33,616,000
1910	15,428,455	22,517,447	37,945,902
1913	23,510,210	31,682,139	55,192,349
1915	14,034,597	30,595,359	44,629,956[6]

[1] Rein's *Japan*, p. 175.

[2] "*Times*" *Japan Supplement*, July 15, 1916.

[3] *The Evolution of New Japan*, pp. 152-3.

[4] Porter, p. 428.

[5] Figures 1908-1910 from Porter, p. 431; 1913 and 1915 from "*Times*" *Japanese Supplement*, July 15, 1916.

[6] This total is less than that of Kobe for the same year, but it must be remembered that 1915 was a war year and therefore exceptional.

The total foreign trade of Yokohama represents about 41 per cent. of the total foreign trade of Japan. Mr. Porter thinks that this superiority of Yokohama will long remain unchallenged, basing his conclusion largely on the Panama Canal, which may make a change in trade routes by which Yokohama will benefit. We are inclined to agree with the opinion already quoted from the *Times*; we scarcely think that Yokohama will benefit more by the problematical success of the Panama Canal than will Kobe, while the industries of the latter city give it an advantage over Yokohama.

Yokohama is the sixth city of Japan,[1] coming after Kobe, but having more than twice as many inhabitants as its immediate successor.[2] It is a great banking centre, no fewer than twenty-four banks having their headquarters there. The first Japanese railway was laid between Tokyo and Yokohama in 1872, and recent railway extensions have connected Yokohama more intimately with its hinderland. In particular, the silk region has been brought into closer relation with its outlet. On the other hand, much of the tea formerly exported through the chief port is now carried to Shimizu, on Suruga Bay, much nearer the tea-producing area.[3]

Nagoya, at the head of Ise Bay, is the fourth city of Japan.[4] Rein says of the city, "It has not particularly attractive environs, but an intelligent, energetic population."[5] Porter tells us that no city of Japan has improved so much as Nagoya,[6] so that Rein's stricture may perhaps be no longer deserved. It is an industrial city, about 200 miles west of Tokyo, and 100 miles east of Kyoto. Here are the centre of the cloisonné industry, the headquarters of "Birmingham" wares (Nagoya manufactures enormous quantities of clocks for the Asiatic market), and many textile factories. Seto and Tajimi, in the hinderland, have potteries, and the area is famous for its porcelain.[7]

To many people Nagasaki is the best known of Japanese ports. This is due to historical circumstances. Regular intercourse between Japanese and Europeans dates from the middle of the sixteenth century, when Portuguese traders were carried to Kiushiu by stress of weather. They followed up a kindly reception by fitting out commercial expeditions. Friendly trading relations were maintained till the Jesuits—"the privateers of the church"—by an aggressive intolerance, raised suspicions in the Japanese that missionaries were the forerunners of an invading army. We have said previously that there were religious and commercial quarrels among the foreigners themselves, and that in 1624 foreigners were expelled. The Dutch traders were exempted from this edict, and were allowed to settle in Deshiman Island—some three acres in extent—near Nagasaki. Here, under humiliating restrictions, they had a monopoly of the trade between Europe and Japan. Somewhat

[1] Census (1913), 397,574.
[2] Hiroshima, pop. (1913), 167,120.
[3] "*Times*" *Japanese Supplement*, July 15, 1916.
[4] Census (1913), 452,043.
[5] *Japan*, p. 188.
[6] P. 437.
[7] Porter makes no reference to Yokkaichi, a new flourishing port of the manufacturing district round Nagoya. Yet it ranks fifth among Japanese seaports. It is situated on the west shore of Ise Bay.

similar limitations were placed on the Chinese.[1] On the western side of Nagasaki lies the little island of Taka-hoko, "from whose steep heights many hundreds of tortured and faithful Christians were once cast into the sea." [2]

Thus Nagasaki, excellently situated at the end of a long narrow bay, along one of the deepest and safest harbours in Japan, was the only port that was not hermetically sealed during the two hundred years of seclusion. Through it western science filtered into Japan. Since the re-opening of Japan to world-commerce Nagasaki has lost ground, and now holds only the sixth place among the seaports. Such a result is due to the superior hinderlands of those ports which have outdistanced Nagasaki. Industrially the Mitsu Bishi dockyard and engineering works are its most important feature. In population Nagasaki occupies eighth place among Japanese cities.[3]

Twenty years ago Moji was a small fishing port; to-day it is the fourth Japanese seaport, with a population of 71,977. This rapid growth is the direct result of Japan's recent wars, no less than of the demand for coal. Moji, "the nearest port to Korea and Manchuria that can be approached by railway either from the mainland or from Kiu-shiu," [4] is the outlet for extensive coalfields; hence it is a great coaling station for both war vessels and mercantile fleets, besides carrying on a brisk coal trade with Hongkong and other Asiatic ports. "One cannot see Moji for coal; the eye of the traveller as he approaches the port is attracted by great dunes of coal on all sides, and his steamer is probably one of the fleet awaiting the services of the small sampans in the harbour to have coal brought to it." [5]

Niigata (Newport), on the west coast of Honshiu, a little above the mouth of the broad but shallow Shinanogawa, is a fishing-port.[6] "Owing to the bar, common to the mouths of Japanese rivers, steamers cannot enter the port, and have to anchor in the open roadstead; hence the trade by sea, never of any real importance, is confined to the summer months—May to October. The winter storms that set in with the north-west monsoon, blowing from the cold Siberian coast, rage with terrific violence, deep snow falls, and traffic ceases." [7] The houses are built with projecting eaves to afford protection to passengers against snowfalls in winter, and against the hot rays of the midday sun in summer.[8]

Space is lacking to describe the cities that have arisen as the result of Japanese expansion. The annexation of Korea—the sword pointed at Japan's heart—together with the growing Russian trade, have given Tsuruga increased importance; by the development of Hokkaido and of Karafuto, Otaru has achieved greatness.[9] For fuller descriptions of these and other cities we refer the reader to the book itself. We are

[1] Porter, pp. 41-47.
[2] Rein, p. 521.
[3] Census (1913), 161,174.
[4] Porter, p. 436.
[5] *Ibid.*, p. 435.
[6] Census (1913), 66,622.
[7] *The Far East* (A. Little), pp. 285-6.
[8] Rein, p. 503.
[9] Porter is wrong in describing Otaru as the largest city in Hokkaido. Its population (1913) is 92,864, while Hakodate has 99,795 inhabitants (1913).

fully conscious that our analysis of these towns yields no synthetic picture of them, and we agree with Mr. Porter that "we can no more get a recognisable picture of a town from prosaic description and statistical information than we can visualise the face of a man who is 'wanted' from the details given at police stations."[1] Yet the details are of some value.

Mr. Porter's volume seems to be merely a reprint of his *The Full Recognition of Japan*, with a new introductory survey dealing with Japan's share in the great war, and the vital questions arising therefrom. We note, for example, that, though the volume is dated 1915, he talks of Mutsuhito as if he were still ruling. Mutsuhito died in 1912, and was succeeded by Yoshihito, the present Emperor. Similarly the awkward phrase "the present year" refers mainly to 1910-11, and no statistics date beyond 1910. For these reasons we fail to understand the purpose of a new title for the volume.

It is interesting to compare the conclusions arrived at by Mr. Porter with those of Professor Oseki in the *Scottish Geographical Magazine* for 1915. There are some absolute contradictions in the two accounts, *e.g.* on emigration questions in relation to over-population, and on the quality of the indigo of the Loochoo Islands.

Mr. Porter's volume is really an encyclopaedia of Japan, and as such is of the greatest value to the geographer. It is weak on the physical and climatic side, so that though the author remains our authority for the present state of the industrial and commercial development of the "Great Britain of the East," we must refer to Rein's classical volume for details of physical structure, etc. Perhaps Mr. Porter may yet give us a new edition of his book in two volumes, one devoted to structure, physical features, climate and people: the other incorporating the economic material he has digested so thoroughly. There is ample room in the market for a modern Rein: it is time we had an up-to-date and authoritative account of the new World Power.

In one respect in particular Mr. Porter deserves our heartiest thanks. He has given us first-hand information in regard to the Japanese Empire, and especially the relatively new area included in that Empire—Formosa, Korea, Karafuto: or administered by Japan,—the Kwantung peninsula and the Manchurian railway. His chapter on the Soya Bean is both informative and interesting.

To economic geographers the whole book is intensely interesting, for no country has achieved the rank of a first-rate Power in so short a period as Japan; and the analysis of the methods, whether they be political or economic, by which her position has been attained, is of very great value. Nor has Mr. Porter overlooked other aspects of Japan's advance. Education, the arts, music, and all that makes for social progress among the people find sympathetic consideration in his pages.

Despite our criticism of details, we cannot but admire the work the author has done, and the manner in which he has presented his results.

[1] P. 441.

The price of the volume—6s. for nearly 800 pages of first-hand information, accompanied by specially prepared maps—should in itself disarm criticism, and we are sure that Mr. Porter's authoritative study will find a place on the table in many business men's rooms; it is not a volume to hide away on the bookshelves.

J. H. BIRRELL.

THE SO-CALLED MYTHICAL ISLANDS OF THE ATLANTIC IN MEDIÆVAL MAPS.[1]

By WILLIAM H. BABCOCK.

THE ISLAND OF THE SEVEN CITIES.

I HAVE necessarily touched on this a little in treating of Antillia because they were so long considered the same, though at the last the two names were rather widely severed. They may have been equally distinct in their earlier use, the one being certainly of historic or pseudo-historic origin, the other geographic only. In support of this, we may point to the fact that the application of "The Seven Cities" to a part of St. Michael is undoubted, but there is no evidence that it was ever called Antillia. Further, we have seen an indication that Corvo perhaps bore the latter name for a time; but without any attribution of seven cities, so far as we know. Indeed they could hardly be supposed to thrive on so small a rock of the ocean. When both names went far westward early in the fifteenth century they adhered to the same island, and may have done so earlier, at least sometimes, in the popular mind.

The final severance was so conspicuous that seventeenth-century Spaniards made expeditions in search of the Seven Cities among inner-continental wilds, although they would have been astonished by the commission to seek Antillia there. They did actually find what they called The Seven Cities of Cibolo, reports of which had been filling their minds with images of grandeur and luring them afar over the sand wastes and ragged ranges—found these "Cities" as the now familiar terraced villages of sun-dried bricks, not over clean nor over rich, and picturesque rather than beautiful, such as sedentary Indians had been building for centuries. All expectation of any surviving descendants or relics of the seven bishops' colony, in the face of incongruous facts, naturally died away.

But about the same time the Island of the Seven Cities set up for itself at sea, with no alternate name. Thus Descellier's map in 1546 anchors it, as an island of considerable size, south-east of Nova Scotia, in a considerably higher latitude than the Bermudas, and opposite what is now a very thickly populated part of America—a choice of location arguing some temerity even in the middle of the sixteenth century. However, at least one map in the Egerton collection of the British

[1] For earlier articles see p. 73 *et antea*.

Museum, belonging to that century, shows the seven cities in the form of tent-like figures, with that collective name and without any island, on the North American mainland along the Atlantic coast, apparently far south of Nova Scotia. The Ortelius map of 1587 adhered to this island as a reality thus named, independent of the Antilles, though reducing its size, and moving it a little farther southward, between the Azores and Bermudas. But that of Quadus, 1608, brought it close in again below "Bacalaos." Soon afterward it vanished altogether from the maps and the name was relegated to unmapped myth and legend.

Thus a geographic and historical entry, which may have begun its career on St. Michael, passed far south-west, then much farther west, in the end returning almost as far as mid-ocean, and there vanishing from the relentless search of modern eyes.

Green Island.

This is not one of the oldest of Les Iles Fantastiques. A favourite hypothesis makes it a duplication or misunderstood reminiscence of Greenland, cut loose from its proper moorings: partly because of its great mass in the earlier illustrations, and partly because it is not known to have appeared before the first delineation of that great northern region in a published map by Claudius Clavus,[1] a little before 1427.

Illa Verde—Green Island—is shown as an elongated rectangular mass of land, somewhat like Antillia, in the extreme western part of a Catalan map, credited to the latter part of the fifteenth century. It is opposite the southern half of Ireland and south-west of Iceland (Fixlanda). Its lower end is recessed to receive a circular Brazil, as already described, the two being nearly in contact. Another Brazil divided into two parts appears half-way across the ocean. This map obviously compromises between differing data: being especially impressed with the amplitude of Greenland and the brevity of the voyage from it to the next land below, necessarily Labrador or Newfoundland, at that time reported only in the sagas and similar writings, unless by traditions which have melted away.

Another map of the same period, bound up with a Paris Ptolemy map, is cited by Nansen as showing at a more easterly point a projection of land depending from its northern border, with an island just below it, inscribed Insula Viridis (Green Island), with additional Latin words importing that it is mentioned by that name in some geography.

Reinel, 1503, makes Green Island larger than Brazil or Mayda, though far less than an adequate Greenland size, and places it more westwardly than even Mayda on the Ireland-Newfoundland route. Schoner, of 1520, and Ribero, of 1529, concur approximately in this latitude, the former especially giving it considerable size. The Latin form of the name is preferred by Ribero as well as by a sixteenth-century Frankfort-on-the-Main map, which Jomard reproduces in his *Monuments*.

Some of these wander pretty far from Greenland in every sense,

[1] Nordenskjold, *Facsimile Atlas*, p. 47, map 27.

but Coppo,[1] 1528, shows Isola Verde almost where Greenland should be, and leaves no room for reasonable doubt of identification. Islands lead down from it in series to Cuba, illustrating his idea of America, and constituting fancy-links of a chain, as to which the map-maker knew little excepting its partly explored ends.

No doubt we have Greenland in the Isola Verde. But a warning against extending the identification to all other instances may be read in the Peter Martyr Antillean sketch-map of 1511, which offers the quite different and most tropical Tobago, near Trinidad, as an Illa Verde. None of the far upper ones, from the latitude of Iceland to that of Ireland, will at all account for this southern specimen. But the name, after all, is a simple and obvious one, which might suggest itself anywhere, as more than one other descriptive term has fastened itself independently in several localities. The chief importance of this is that we are not absolutely bound to credit Greenland, any more than Tobago, with every Green Island which may occur on the maps on the American Atlantic coast.

A striking instance of this occurs in the map of Nicolas Nicolay, 1560, which carries an Illa Verde, as before mentioned, quite into the boundaries of Newfoundland, then believed to be several islands rather than one, its companion, Man, being divided from Labrador only by a narrow strait, and Brazil anchored quite near on the other side. The author of this important map unquestionably considered these islands neither European, nor oceanic, nor Arctic, but American of the temperate zone. Probably he would have explained that Green Island was so called because it was green; as has been since asserted by an alleged eye-witness of the rock supposed to represent it, and charted by its name.

But this was an isolated case: Green Island usually remained oceanic, in or rather eastward of mid-ocean, and as a more or less distant consort of the Crescent Island, called Mayda or Vlaanderen. Descelliers, 1546, indeed has it as a small island in the longitude of the tip of Labrador, but the latter stretches too far east. St. Brandan's Island is Y. Verde's westward neighbour. Ortelius, 1570, does not show the latter; but a later issue of this map in 1587 presents Y. Verde west of Vlaanderen in the region north of the Azores.

In the eighteenth century it was still faithfully holding its ground. Thus, French maps of 1722 (or 1733), 1754 and 1770 show Isla Verde or Isla Verte west of the Azores and in the belt between the latitude of Brittany and that of Gascony.

It appears likewise on Bellin's chart of 1766 in latitude 40° 51′ and longitude 26 35′ as Ile Verte or Green Island; in Faden's atlas of 1776 as Green Island or Ilha Verde in longitude 24°, four degrees west of its consort Mayda; on the English chart of Jeffrey, latitude 40° 45′ and longitude 26° 10′; in the atlas of Johnson, near the latter part of the next century, similarly situated, and, I believe, even as "Green rock" on a relief map copyrighted in 1906, which certainly shows Mayda

[1] Kretschmer, *Entdeckung*, Taf. xiv.

about in the latitude of the mouth of the Loire, also Negre's Rock and other geographical features no longer accepted.

The diminishing change last indicated, like the addition of Rock to Brazil, seems to have occurred early in the nineteenth century, by which time it had become difficult to believe in an unfamiliar island of considerable area anywhere in the much-traversed North Atlantic, although a few square feet of solid surface in the watery waste, only now and then perceived by passing vessels, might seem possible—especially in view of the barely submerged Virgin Rocks and the white sail-like upjutting of Rockall. There was and is some mariners' evidence as to Green Rock's existence, the following instance of which has been kindly supplied by the Hydrographic Office of the United States Navy :—

"Captain Tulloch of New Hampshire stated that an acquaintance of his, Captain Coombs of the ship *Pallas* of Bath, Maine, in keeping a lookout for Green Island, actually saw it on a remarkably fine day when the sea was smooth. According to the story, he went out in his boat and examined it, and found it to be a large rock covered with green moss. The rock did not seem much larger than a vessel floating bottom up, and it was very smooth all around. The summit was higher than a vessel's bottom would appear out of the water, being about twenty feet above the surface of the sea. Captain Coombs added that if the object had not been so high he would have thought it to be a capsized vessel. A sounding taken near this spot shows a depth of 1500 fathoms exists there.

"Captain R. C. Damie, master of the British steamer *St. Andrews Bay*, reported that on two trips across the Atlantic he examined the locality in which Ile Verte was said to exist and could find no such indication of such an island. On April 30th, 1884, his position at noon put his vessel right over the supposed island, and there was no discoloured water nor anything to indicate a danger."

The same letter relates soundings of H.M.S. *Cyclops* with 1500 fathoms line in lat. 46° 42′, long. 13° 05′, and again with 1800 fathoms in lat. 46° 12′, long. 13° 03′, not reaching bottom in either instance : also by H.M.S. *Gorgon*, 1858, getting bottom in 2350 fathoms in lat. 47° 06′, long. 12° 57′ ; and U.S.S. *Dolphin*, same year, 2190 fathoms sixty miles southward of the same.

The conclusion of the Hydrographic Office is that these imagined rocks and islands were errors of early navigators in "the age when the sea was unfathomed," and were often due to misleading appearances of the surface of the sea.

But besides the bare possibility of a lance-like rock jutting up from great depths and not officially discovered, the chance of temporary volcanic uplifting cannot be absolutely disregarded. There are well known and undoubted instances of this kind off the coast of Iceland, in the Malay archipelago, along the Aleutian chain and among the middle group of the Azores. Quoting from Westropp's *Brazil*, etc., p. 246, "A volcano rose over the sea fifteen miles to the north-west of St. Michael in 1719 and sank in 1723. It was said to have previously appeared in 1638.

In 1720 another island rose about a mile from the shore of St. Michael; and in the same year a third was upheaved twenty-eight leagues away toward Terceira. It was two leagues across and when it sank was long traceable as a shoal." One of these islands received the name of Sabrina from that of a British naval vessel which witnessed its emergence.

But Green Rock is perhaps sufficiently explained by dwindling reminiscences of Green Island, quickening the sailors' fancy; and Green Island is in numerous instances derived from Greenland, in some others from green lands of the West Indies or along the temperate shore of North America.

Drogio and other Zeno Islands.

In the latter half of the sixteenth century there was published an account of the travels and adventures in the north-west, in about 1400, of the Venetian brothers Antonio and Niccolo Zeno, who are alleged to have written narrative letters, illustrated by a map. This book was the work of a post-Columbian, Niccolo Zeno, and is, some believe, a downright forgery. Others consider it an honestly intended reproduction of the original map and narrative, the additions, interpolations and changes being partly due to misunderstandings by the original Zeni, partly to damages accidentally inflicted and inaccurately repaired, and partly to extraneous matter of illustration and ornament, which the latter Niccolo Zeno had not the self-control to withhold. Whatever the truth may be, the effect on subsequent cartography was admittedly very great. In particular, Zeno added to the geography of the world a number of islands which were either non-existent or far from their right places and disguised in other ways. The more western of these were derived from the incorporated narrative of a fisherman who professed to have been driven on a part of the American coast, perhaps about 1380, and to have spent many years among the natives, journeying from region to region.

The most conspicuous of these new islands is the great Frisland or Frislanda, south of Iceland, in the latitude of the Orkneys, the two belonging to the realm of "Zichmi" (perhaps Earl Sinclair), in whose service were the two elder Zeni of the narrative, one of them for a number of years. Mr. Major believed that the blurring of the original map made the Faroe islands appear as one, and they were thus copied as Frisland by the younger Niccolo Zeno; and this is made probable by the actual insignificance of the thread of water dividing the two chief islands. The island cluster, indeed, approaches unity on the map of Olaus Magnus, which is apparently quite independent; and actually blends into one, bearing the name Ysferi, on the anonymous Cottonian map reproduced by Santorem as of the eleventh century. The map last mentioned surpasses that of the Zeni in displacement, for this large island is shown but a little north of west of southern Ireland. Furthermore, the name Frisland is used for the Faroes in a letter attributed to Christopher Columbus, and copied by his son Ferdinand in a somewhat dubious biography of the discoverer. Whether genuine or invented,

this letter proves that the name was currently understood in the above way, at least in certain quarters, about the end of the fifteenth century. All things considered, we may fairly treat the delineation of Frisland, wherever occurring, as merely a duplication of the Faroes, blended into one island and moved out of place.

Polanda, another name and figure, is easily recognised as the main Orkney island; Noeme, a little above it, as a lesser member of the same group; and Estland as Shetland. Icaria—north-west of Frisland, south-west of Iceland, and far west of Shetland—has always been a puzzle, the two leading conjectures preferring Kerry and St. Kilda. The latter seems altogether more feasible, for surely every part of Ireland was too well known and frequently visited to permit of such a feat of cartography. But St. Kilda is rather remote in the mists of the Atlantic, no trade route went near it, and it may have been rarely visited. But, again, the name Icaria may have been imported bodily from the reconstructor's reading in Greek mythology, as the accompanying narrative undoubtedly was.

Estotiland was the region south-west of Greenland, where the informant of the original Zeno brothers professed to have landed first with his companions. Ortelius before the end of the sixteenth century expressed the opinion that it was the Wineland of the Norsemen. On most maps, including his own, it is shown apparently as Labrador or Newfoundland, though sometimes standing for an ampler area. Thus a French map,[1] having 1668 for its latest entry of discovery, and perhaps dating from near 1700, presents the whole region south-east of Hudson's Bay as called Estotiland by the Danes, Nouvelle Bretagne by the English, Canada Septentrionale by the French, and Labrador by the Spanish. But there can be no question that as a rule Estotiland stands for the out-thrust elbow of north-eastern America, which finds its climax in Cape Race, almost due south of Godthaab, Greenland, south-west of Iceland, and pushing far toward Europe.

The name has always been a puzzle. Kohl[2] suggested East-outland, but why it should take an English form in passing from a Norse Icelander to an Italian is not clear. Still less can we suppose an Italian to have invented an English form in this instance only. Another suggestion finds the source in an Italian family motto, the beginning of which might possibly be corrupted into such a likeness. But we do not perceive that the Zeni ever adopted this expedient in devising other names, or were influenced thereby in repeating and recording them. A better conjecture is that of Eugene Beauvois[3] that *c* has been misunderstood as *t* by the later reconstructor, especially as the resemblance between the letters is said to be rather great in some kinds of early script, and there are older map-names which certainly look as if this had happened. This would make the original form Escotiland or Escociland, which may well be Scotland, partly transformed by Italian vocal

[1] Copy in U.S. National Museum.

[2] *The Discovery of Maine*, p. 105.

[3] *La Découverte du Nouveau Monde par les Irlandais*, p. 90.

organs. Only a little below, Great Ireland had been located by Norse conjecture: and geographical writings, contemporary with the alleged Zeno voyages, or nearly so, repeated the statement. Indeed, to this day we apply Nova Scotia to the upper part of the earlier Wineland next south of Cape Race.

From Estotiland—let us say Newfoundland—the unnamed informant of the Zeni declared that he was sent to Drogeo, where he became a captive of a savage fisher-race of natives, who appreciated his skill in net-making, so that he was coveted, and passed from tribe to tribe south-westward a long way, at last escaping, making his way back, and in the end reaching first Estotiland, then Greenland, and finally his northern island home ruled by Zichmi, possibly Earl Sinclair. Whatever else may be said of this remarkable narrative—which contains some unbelievable things—it at least conveys an unmistakable impression of movement down the continent from Estotiland. Cape Breton Island, next to the southward, and barely separated from the mainland, would, geographically, be the most natural Drogeo.

It is clearly so identified by the standard Mercator map of 1595, which shows an island quite too far off shore, but with a pretty fair approximation to the correct outline and the double name "Drogio di Cornu Gallia." Of course the long peninsula of the Bretons on the other side of the ocean is the Horn of Gaul. Breton sailors and fishers had transplanted nearly a century before the name here Latinised; and it still holds out in the hollow, long-horned island cut off by the Gut of Causo.

The insularity of this interesting historic land-mass had been ignored in divers maps, but was greatly exaggerated in others, for example, the Ortelius and Mercator maps of 1587, besides the one above cited. Sigurd Steffansson's[1] map of 1590, marked 1570, seems to show its long horn running northward on the western side in his Promontorium Vinlandium, but the map breaks off near its base, and we gather only uncertainly from an inscription that he understood the coastline to be continuous, running considerably below that point. On some other maps the island of Cape Breton was broken up into several islets, faring no better than the Newfoundland of divers versions.

The name Drogio (also written Drogeo and Droceo) has been accounted for very loosely, and generally as a modification of some Indian word. But all the other Zeno names are European derivatives. Perhaps the best guess we can make would point to deroga or dirogare as supplying a form contracted to Drogio, for the lower island in geography and altitude was also, according to the narrative, inferior in social development, and might well be spoken of derogatively. This seems to have been the fisherman's own relative estimate, for the Zeno echo makes him speak respectfully of the ruler of Estotiland who dwelt, it says, in a town, had a Latin book, and an interpreter, and

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[1] Torfaeus, *History of Vinland: Storm Studies on the Vinland Voyages.* Map also copied by Higginson, Weise, Vining, Westropp, and others. Also in my *Early Norse Visits to North America*, p. 62.

carried on some primitive trade with Greenland, although unacquainted with the use of a compass: whereas he found the people of Drogio sunk in mere brutish savagery.

One's general impression of the Zeno narrative is of a meagre background of truth greatly distorted and hopelessly painted over by the fancy of a yarning sailor, and by the earlier and later members of the Zeno family, most florid and ingenious Venetians. But these two of their islands, Estotiland and Drogeo, however derived or devised—and of course the second Niccolo Zeno had many sources from which he could learn of them—seem to be reliably North American.

Miscellaneous Islands.

By the middle of the sixteenth century Atlantic islands had grown so plentiful on the maps that there might be some excuse for a repetition of Edrisi's estimate of 27,000. It is no wonder that fancy took flight at random, distributing others. The maps of Descelliers, Mercator, and Ortelius are veritable curiosity collections of these fleeting names and figures, sown among the more durable ones which we have considered, and the undoubted ones which every map still retains.

Far to the north, Greenland had another reflection besides Isola Verde in Grocland, on its western side, if this were not a mere enlargement of Disco. It appears conspicuously on Mercator's map of the Polar Basin, 1569,[1] the Hakluyt map of 1587[2] illustrating Peter Martyr, and the map of Matthias Quadus, 1608.[3]

Between Iceland and Greenland, Ruysch's map of 1508 had shown the site of a small unnamed island with a note that it had been totally destroyed by "combustion" (presumably volcanic) in the year 1456. As this is the site of Gunnbiorn's Skerries, alleged in early Icelandic writings to have been visited near the end of the ninth century by the navigator who first saw Greenland, it is hard to share Nansen's total disbelief in the Ruysch story. It seems quite certain that such things have occurred off the south-west coast of Iceland; why not, then, so very little farther afield, almost in the same general direction.

Much earlier, Bianco, in the seventh plate of his atlas of 1436, had presented in the north-western Atlantic the much-discussed island Stokafixa—the stockfish or codfish island—which some have supposed to be American, though with no tangible warrant. It may have been Rockall, where these fish were long afterward discovered or rediscovered in great plenty.[4]

Further south on many maps of the seventeenth century appeared a really notable figure, inscribed Buss, sometimes of area comparable to Iceland or Ireland. After disturbing mariners for many years by its threat of lying in wait, and never again being really found, a theory of cataclysm seems to have become dominant, so that it was generally

[1] Winson, J., *From Cartier to Frontenac*, p. 64.
[2] Nordenskjöld, *Facsimile Atlas*, text map, p. 131.
[3] *Ibid.*, Pl. XLIX. Winson, J., *From Cartier to Frontenac*, p. 68.
[4] Humbolt, *Exam. Critique*, vol. ii. p. 107.

known as the Sunken Land of Buss, in recognition of what had been, but existed no longer. Quite recently this view has revived with the scientific excuse of the submerged range of Faraday Hills, really ocean-bottom mountains 8000 feet high, between Ireland and Newfoundland, as determined and charted by Captain Carteret of the cable ship *Mines*. They would need a great lift to reach the surface, notwithstanding their present elevation; but in itself this could not be set down as impossible. However, there is no need to explain in that way the natural result of Frobisher[1] naming after one of his ships, *The Buisse* of Bridgewater, a coast unexpectedly sighted, where by his reckoning no land ought to have been. Its description accords best with the unwelcoming front of Greenland; so there is general agreement that this was what he rediscovered and misnamed, his reckoning being astray. "Very high and craggy" it was, "and almost covered with snow, great isles of ice being on the sea like mountains, and very foggy," according to Hakluyt in 1599. It may rank as the third offspring of Greenland on the maps.

Buss enjoys the distinction of being the latest born of all the mythical Atlantic islands, unless we except Negra's Rock, with other alleged and unproven apparitions of land on a very small scale, which probably have not quite ceased even yet. Furthermore, Buss is our only mythical island as to the origin of which there is practically no uncertainty, and it shows a bit of American land—for Greenland is American—erroneously called an island of the ocean, a hint worth considering. Buss appeared on maps of 1661, 1668, 1680, 1702, 1715, 1724, and divers others, not being finally dislodged and discarded until 1850.

Reference has already been made to The Island of Demons shown by Gastoldi, for Ramusio, as the northern tip of Newfoundland; also to Nicolay's crescent-form I. Man, which occupies the same position, linking two insular traditions in one at the straits of Belle Isle. But the Isle or Isles of Demons may more properly be said to belong to Labrador, or the dreaded Gunningagap passage below Davis Straits between Labrador and Greenland. Ruysch, 1508, is among the first to make this last exhibition, his two Insulae Demonium being near its middle. This is the same map that marks the site of the "burnt" island in the like passage on the other side of Greenland; but we have no link between the two sinister items. If there was any non-volcanic reason for giving the western ones an infernal name it does not appear; nor is there any reason to suppose that any real islands ever existed where he shows them. Possibly they may have been icebergs or ice-floes that "growled and roared and howled," according to Coleridge, "like noises in a swound."

The map of 1544, attributed to Sebastian Cabot,[2] makes a single island of them, marked Y. Demonos, and brings it nearer the eastern

[1] Hakluyt, *Voyages of the English Nation*, vol. iii. p. 93. Cited in reply to Poole, H. S., "The Sunken Land of Buss" (1902). *Transactions of Nova Scotia Institute of Science*, vol. xi. p. 192. Note in reply, p. 551.

[2] Kretschmer, *Entdeckung*, etc., Taf. xvi.

front of Labrador, below Hamilton Inlet. Agnese in the same century enlarges it nearly to the size of the main body of Newfoundland, which he also shows, but keeps it still off the eastern Labrador coast. The Ortelius map of 1587 shows the islands plural again in form and name, but retains approximately the site chosen by Cabot. The Mercator map of 1595 keeps them plural, but moves them down to the left side of the upper tip of Newfoundland, apparently compromising between Ramusio and Ortelius, or some predecessor.

There is something impressive in so pronounced and general a concurrence of belief in diabolical evil on the north-east coast of America. It is there that the Arctic current brings down its tremendous freight, and tempests are at their wildest, and all barrenness and bleakness at their worst: but even the concurrence of these phenomena, extremely hostile to man, can hardly quite explain its reputation as a haunt of devils.

The coast below them, where the forest country began, was the Markland of the saga of Eric the Red and of the Icelandic records. The latest mention of it which can be called historic is in several of the annals of the island—not much later in date, one at least being fairly contemporary. They agree in relating the visit of a Greenland ship in 1347, which had been to Markland, the latter name being mentioned as might be that of Ireland or any other well-known country.

The Catalan map, copied by Nordenskjöld, Nansen, and Westropp, and more than a hundred years later, may possibly preserve a reminiscence of this voyage, or at least of a feasible passage between Greenland and Markland, in the relative position of Green Island and Brazil, and the close relations between them illustrated. But this assumes, with Storm and others, that there was then a recognition of identity, total or partial, between Markland and Brazil, of which we have no positive evidence. The derivation of the words offers no corroboration, for there is no reason to suppose that Brazil was at first connected with the idea of wood; and Markland is simply an obvious descriptive word which had been previously applied for the same reason in two languages to the totally unrelated Madeira.

A passage of an old MS. sometimes attributed to Abbot Nicholas of Thingeyri in the second half of the twelfth century, states that some say Wineland extends from Africa, and, if this be so, Markland is divided from Wineland by a sea running in between them.[1] This would tend towards establishing its insularity: this "sea"—if Markland be Newfoundland—being in fact the Straits of Cabot: but Markland appears by that name on one map only, that of Stefansson, 1590 (except very recent and illustrative ones), and there it is shown as a peninsula.

Wineland or Vinland has at least been mentioned as an island—by Adam of Bremen in the eleventh century—and is treated by Nansen as probably another presentation of the Fortunate Isles, partly on the faith of a continuation of the passage above quoted, in which the writer speculates on its possible connection with Africa, although great store of

[1] *Storm Studies on the Vinland Voyages.*

other material is also offered in support of this thesis. Full discussion of this matter is needless here, having been undertaken in my *Early Norse Visits to North America*, and requiring more space than would be in keeping with the plan of these papers. It may suffice to say that I understand Wineland to have extended from the tip of Cape Breton Island far enough southward to have provided impressions suggesting the warmth and luxuriance of northern Africa, at least in summer time.

The Grand Banks of Newfoundland, the Virgin Rocks, and perhaps others raised from that bed nearly to the surface, Sable Island a long way off shore, and duplications of Cape Breton Island or parts of Newfoundland, may be fairly held accountable for some of the islands or substitute names no longer found on the maps: for example, Arredonda and Dobreton, Jacquet I., Monte Christo, Baccalaos, I. de Juan, and perhaps Juan de Sampo, and Encorporado Adondo. From here down, and especially much farther south, on the tracks of the vessels plying from the eastern archipelagoes to the West Indies, religious enthusiasm came into play. St. Anne and the Island of the Seven Cities have been already touched upon. La Catholique, St. X. and Incorporada (in the sense of Christ's incarnation) are among the more conspicuous instances of this influence. The first-named was always in low latitudes. It occurs as La Catolica near the latitude of the tip of Florida and north of Barbudo on a Portuguese map, unnamed, of the Riccardiana Library, also in the French form first given, on the map of Descelliers, and on other maps. Descelliers gives Encorporado as Encorperade. Hood's map of 1592 (Kunstmann, Blatt XIII.) makes a wilder change to Emperedada and puts it opposite Savannah and above the Bahamas, but not so far east as the outjutting of the coast which must be meant for Cape Hatteras and its neighbourhood. But this position was not very remote from that generally ascribed to it.

There are other islands, mostly north of the latitude of Bermuda and between it and the Azores or north-eastern America, which one can make little of, except as probably complimenting some pilot or skipper, or commemorating some incident which has, nevertheless, been forgotten. Such are I. de Garcia or de Guarra, Y. Neufre, Y. de Hyanestienne, Lasciennes, and divers others scattered about in different maps and giving no promise of rewarding the labour of hunting down their records, were that possible. Perhaps this may be also true of Painters' Wives Island, referred to in a note to a 1710 edition of Swift as a parallel to Brazil Island in the realm of myth and fancy. All these distinctly post-Columbian islands are quite too recent to throw any light on the earlier historically and geographically significant "mythical islands" or on what these reveal.

(To be concluded.)

THE CIVILISATION OF BABYLONIA AND ASSYRIA.[1]

(With Illustrations.)

THE publication of Professor Jastrow's large volume fills a long-felt want. For although the literature of Assyriology has in recent years swelled to enormous dimensions, it has been for the most part of a technical description calculated to interest only the Babylonian scholar. The subject of Assyriology has now in fact become so large that it has had to be subdivided, one special branch of the cultural life of ancient Babylon engrossing the lifetime study of a band of scholars, while others devote themselves with as much intensiveness to other branches of the subject. The result has been that amid all this specialisation the general reader has been apt to become bewildered and lost, and has not had before him any material from which he could glean a sufficiently accurate impression of the significance of that momentous civilisation that dominated the valley of the Tigris and Euphrates for more than three thousand years. Popular manuals there were in plenty, no doubt, but these confined themselves to setting before the general reader some of the more interesting aspects of early Babylonian life that the excavations and inscriptions had revealed; they did not attempt to give a general conspectus of the whole subject. Kaulen's *Assyrien und Babylonien*, the only book which tried to give a comprehensive view of Babylonian civilisation, has become, in spite of new editions which have been largely rewritten, out-of-date, but now

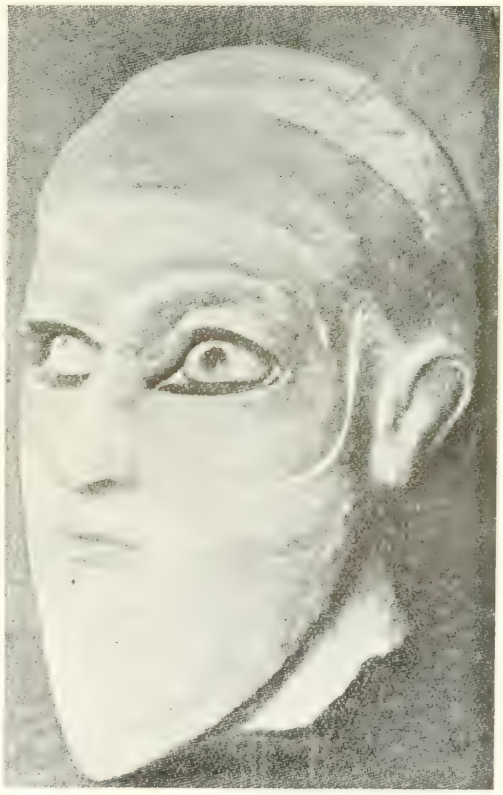


FIG. 1.—Limestone Head showing early Semitic type in Babylonia (Bismya).—From *The Civilisation of Babylonia and Assyria.*

[1] *The Civilisation of Babylonia and Assyria*: *Its Remains, Language, History, Religion, Commerce, Law, Art and Literature.* By Morris Jastrow, Jr., Ph.D., LL.D., with map and 164 illustrations. Philadelphia: J. P. Lippincott Company, 1915. Price 25s. net.

Professor Jastrow has presented the English-speaking reader with a volume embodying the very latest researches and discoveries, which will for long be a standard work of reference, not only for the Babylonian scholar but also for the general reader.

Professor Jastrow gives a succinct account of all the excavation work carried on in Mesopotamia from the days of Rich and Layard to the more scientific work of the American and German Oriental Societies in later years, and brings his account of exploration work right down to the time of the outbreak of the war, when, of course, all such work had to be suspended. He shows clearly how much work has still to be done in uncovering the early Sumerian cities that still are untouched by the explorer in Southern Babylonia, and especially along the Euphrates valley. Not until the excavation of these earliest cities has been completed will the great question be settled as to whether the indigenous inhabitants of the region were Semitic (Fig. 1) or Sumerian, and whether the civilisation that took its rise there was Semitic or non-Semitic in origin. Jastrow accepts the view of Edward Meyer that the original inhabitants were Semites who at an early period were conquered by Sumerians (Fig. 2) coming from the hill-country of Persia, or Elam as it was in antiquity, and that finally the Semitic population regained the supremacy. Jastrow also thinks that the written language was originally Semitic and not Sumerian. Many scholars of course refuse to accept these views. Professor Delitzsch, for example, the greatest Assyriologist of our day, points out that the ideograph for "water" is "a canal picture" and that for "bird" is the picture of a swimming-fowl. Surely these things point to the cuneiform ideographs having originated among a people that inhabited the alluvial, artificially irrigated plains of lower Babylonia. And although Professor Jastrow points to the existence of the stage tower (Fig. 3) or "ziggurat" as a characteristic feature of the Babylonian temple of every age, and concludes that its origin was the symbolical representation of a mountain, with the dwelling of the god on the mountain-top, yet the evidence on this point is far from conclusive, and the "ziggurat" may have had, as other scholars maintain, an astronomical origin. Herodotus gives

Fig. 2.—Sumerian type. From *Babylonia and Assyria.*

countenance to this latter view. Or it may be, that just as Nebuchadnezzar built the "hanging-gardens" of Babylon to please his wife who pined for the mountains of the north in the heated Babylonian plain, so the early Babylonian priests built their stage-towers to propitiate the stern storm-gods, whom they thought of as dwelling on the tops of the far-away mountains. At any rate, the stage-tower survived in Babylonia from the earliest Sumerian times to the period of Islam, and one still standing at Samarra (Fig. 4) was erected as late as the ninth century. The tower is always independent and separate from the temple proper, and this tradition seems to have been taken over in building the Mohammedan mosque and the Christian Church. "In the church architecture of Italy," says Jastrow, "we find a tower built quite independently of the church as in the case of St. Mark's in Venice and of the cathedrals in Florence and Pisa, while in Norman architecture it becomes attached to the church, and in Gothic architecture the tower becomes a steeple placed in the church, and with a complete departure from its Babylonian-Assyrian counterpart is looked upon as a symbol of Christianity, calling upon its followers to direct their thoughts heavenward."

FIG. 3.—Restoration of stage-tower or ziggurat of the Anu-Adad Temple at Ashur.—From *The Civilisation of Babylonia and Assyria.*

One of the most valuable portions of the book deals with Babylonian and Assyrian gods and religious customs. Not emphasising, as other Assyriologists do, the astronomical significance of the various gods and goddesses, Professor Jastrow points out that the Babylonian Pantheon originated in nature worship, and the identification of certain gods with stellar phenomena was a later addition to the cult. The extensive belief in the evil power of demons and methods of exorcising them by incantations and medical arts are described at great length. Bodily suffering was due to the activity of demons that have either of their own accord entered the body of the victim or that have been induced to do so through the power exercised by a special class of sorcerers and sorceresses who are able to bewitch one with the aid of the demons. And Professor Jastrow attempts to relate this primitive and animistic demonology to modern theories of disease. He says: "A cramp, a throbbing of the head,

a shooting pain, a burning fever naturally give the impression that something—to speak indefinitely—is inside of you producing the symptoms; and modern science, curiously enough with its germ theory to account for so many diseases, comes to the aid of the primitive notion of demoniac possession." To secure relief, it was therefore necessary to get rid of the demon—to exorcise the mischievous being (Figs. 5 and 6). It was also natural to conclude that the demons, ordinarily invisible, lurking in the corners, gliding through doors, hiding in out-of-way places to pounce upon their victims unawares, should be under the control of the gods as whose messengers they thus acted. The object of the exorcist was either by cajoling or disgusting the demon to induce him to leave the body. The object of medicine

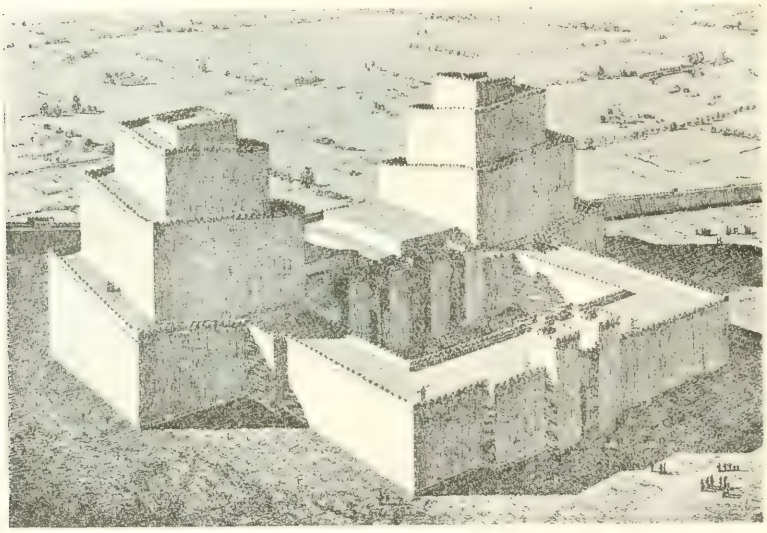


FIG. 4.—Mohammedan Tower at Samarra on the Tigris.—From *The Civilisation of Babylonia and Assyria*.

administered was to disgust and nauseate the demon by its nastiness, and compel him to desert his victim. To protect against demons (Fig. 7), amulets of various kinds were worn and magic incantations were repeated. The divination so largely practised by Babylonian priests, whether by hepatoscopy, *i.e.* augury from observation of the liver of a sacrificed animal, or astrology, receives in Professor Jastrow's book most competent and skilful treatment.

But it is for his accurate recording of the work done by scholars in deciphering the cuneiform script and in translating the extensive cuneiform literature that we are most deeply indebted to Professor Jastrow. While explorers in every part of the world have had their due meed of praise for their work, and discoverers and inventors in the region of natural science have received the thanks of their fellow-men, that small band of scholars who in the course of last century by

patient indefatigable work uncovered for us a civilisation extending for over three thousand years have not yet had justice done to them. Face to face with difficulties that seemed wellnigh insurmountable, without a single clue to the reading of that baffling script on the tablets of clay and stone that travellers brought from the lands of Persia and Mesopotamia, these scholars set to work, and by sheer intellectual brilliance, step by step, unravelled the mysteries, and succeeded thus in rebuilding not only the complex language of Babylon and Assyria with all its

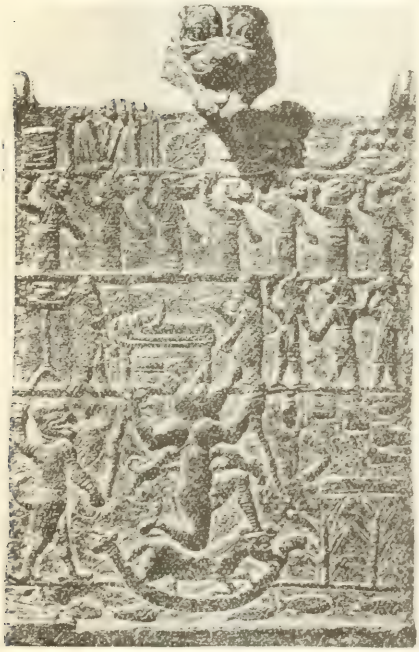


FIG. 5.—Bronze plaque showing exorcising ceremony, obverse.—From *The Civilisation of Babylonia and Assyria.*

FIG. 6.—Bronze plaque showing exorcising ceremony, reverse.—From *The Civilisation of Babylonia and Assyria.*

variations over the three thousand years it was in use, but also the earlier and more difficult languge of the Sumerians. And not yet is their work finished. The language of the Hittites and their hieroglyphs are still sealed to the modern world, but the patient labour of devoted scholars will break the seals, and reveal to us yet more knowledge of the early peoples of Western Asia. In the section of his book on "The Decipherment of the Cuneiform Script," the author gives a clear and accurate account of the labours of Rawlinson, Oppert, Hincks, Grotepend, and other illustrious scholars, whose discoveries were no less epoch-making and no less romantic than those of other pioneers of whom the world has heard much more.

The closing section of the book is devoted to "Specimens of Babylonian and Assyrian Literature," among which are embraced selections

from the religious and epic literature, from commercial correspondence and private letters, medical prescriptions, astronomical reports, etc. Most interesting, perhaps, are the extracts from a Babylonian work giving a counterpart to the Book of Job, and of another with moral precepts similar to Ecclesiastes. There seems to be some close resemblance to

Fig. 7. Types of demons (upper figure). The lower figure is a human-headed lion, a monstrous being akin to the demons.—From *The Civilization of Babylonia and Assyria*.

these Biblical Books in such quotations as this from the Epic of Gilgamesh. Compare Eccl. ix. 7-9.

"Day and night be thou merry,
Daily arrange a merrymaking,
Day and night be joyous and content!
Let thy garments be pure,
Thy head be washed, wash thyself with water,
Regard the little one who takes hold of thy hand,
Enjoy the wife lying in thy bosom."

The book is furnished with a copious index, and is abundantly furnished with fine plates. By the courtesy of the publishers we are enabled to reproduce some of the figures here.

ANDREW C. BAIRD.

GEOGRAPHICAL NOTES.

EUROPE.

The Problem of the Southern Slavs.—In the spring issue of the *Bulletin* of the Société Languedocienne de Géographie, there appears, partly in translation and partly in summary, certain chapters from a book on Dalmatia, published a few months before the outbreak of war. The book is by M. Antonino d'Alia, who was for a long time Italian consul in Dalmatia, and is entitled *La Dalmazia, le Regioni limitrofi e L'Adriatico*, and seems to include a somewhat full treatment of the nationalities of Austria-Hungary. The passages translated and summarised relate especially to the government and constitution of Austria-Hungary, the different races, and the political aspirations of the Slav majority, and notably the changes which these have undergone in recent years. M. G. Quesnal, the translator, adds a brief preface, in which he points out that three political parties are, or were immediately before the war, represented among the Southern Slavs. The first party, that of the Trialists, desired the establishment of a third state in the present Dual Monarchy. This third state would include all the Austrian Southern Slavs, and would have the same rights, the same independence, the same autonomy, as the present existing states of Austria and Hungary, but would be closely allied with them. Another party wished to go further, and to unite the Southern Slavs round an independent kingdom of Croatia. Finally, the successes of Serbia in the Balkan wars, and the apparent willingness of the free Serbs to make many sacrifices, *e.g.* of their alphabet, their calendar, etc., to facilitate union with the Croats, had led to the founding of a third party, which contemplated the establishment of a large Southern Slav state, which would include free Serbia and Montenegro, Bosnia-Herzegovina, together with Croatia, Slavonia, Dalmatia, Istria, etc. M. Quesnal believes that it was the rise of this last party which prompted Austria to send her ultimatum to Serbia, and thus brought about the present war. As M. d'Alia's book may not be accessible to many, attention may be drawn to the summary, which contains some interesting facts, especially as regards the numbers of the different ethnographical groups in Austria-Hungary. It is interesting to note that it is stated that while the Magyars number 10,000,000, it is the minority, including some 500,000 persons, and forming the landed proprietors and their party, who exercise political supremacy, both over the Magyar population generally, and over the other nationalities of Hungary. Their supremacy is menaced not only by the progress of the Slavs and Latins of Hungary, but also by the rise of political consciousness among the great mass of the

Magyar community. Their alliance with the Germans is said to be largely based upon their desire to maintain their own privileged position.

Asia.

The Fauna of Lake Baikal.—The Imperial Academy of Sciences, Petrograd, has received a donation from a Siberian gentleman for the purpose of establishing a biological station on the shores of Lake Baikal, and has appointed a commission to consider the steps to be taken with this object in view. The fauna of the lake, which is excessively deep, has long been known to be very remarkable, some of the fishes being peculiar to the lake. Among these are certain very ancient forms, believed to be vestiges of the sub-tropical fauna of Siberia in Upper Tertiary times. A detailed survey of the biology of the lake would throw considerable light on the former distribution of land and water in Asia, and could best be carried out from a permanent station.

The Future of Asiatic Turkey.—Mr. Leon Dominian continues his studies of the problems of the Near East, by an article in the *Geographical Review* for April, entitled "Europe at Turkey's Door." The article is illustrated by a simple but clear map, and though it does not contain much that is new, is of interest as setting forth the views of a neutral observer, and one remote from the scene of conflict. Mr. Dominian indicates once again the reasons why the European powers are interested in the fate of Turkey's Asiatic possessions, and seems to contemplate that Mesopotamia with the Persian Gulf will tend to fall more and more under British control, and that, in the event of an Allied victory in the present war, the caliphate will be separated from the Turkish sultanate, and with the establishment of the ecclesiastical chief of the Mahometan world at Mecca, British control over the whole peninsula of Arabia will become inevitable. Mr. Dominian strongly supports the view that Russia has a right to Constantinople, and to the control of the Dardanelles, though he suggests Alexandretta as an alternative port if Constantinople is unobtainable. The whole of Armenia is, he believes, destined sooner or later to pass under Russian control. France, he considers, will more and more find her sphere of interest in the vilayets of Syria, but he holds that Greece has a far greater claim to the Dodecanesian islands than Italy, in whose occupation they are at present. The author regards the fundamental point about Turkey as being that she is essentially a roadway, a bridgeland, owing to the commanding position which she occupies with reference to the trade between Europe and Asia and Africa. "As soon as this point of practical geography is recognised it will be easy to provide international legislation in which the claims of interested powers will be harmonised. But no solution of the political problem involved can ever be attained without full consideration of its geographical aspects." The extreme optimism of the first of these two sentences would, we fear, be impossible at present to any geographer, however enthusiastic, on this side of the Atlantic.

Africa.

Germany's African Colonies.—Mr. Cyrus C. Adams contributes a short article on this subject to the *Geographical Review* for June last. He points out that German possessions in Africa have a total area of 1,030,150 square miles, and are thus a little more than four times the size of Germany. "At the beginning of the war, in August 1914, they had reached a state of prosperity that bid fair to justify the enormous expenditure of money, if not the appalling loss of life, chiefly native, that had marked their development. They were all in a thriving condition, though still in the early stages of their history. In the management of her colonies Germany has shown marked limitations as well as superior qualities. In her dealings with the natives coercion has been the policy, though England, for example, has found it wise, as well as humane, to use severe measures only when milder methods have failed. The military expenditures have been enormous in all the German colonies excepting Togo. Between 1891 and 1903 Germany sent out twenty-nine punitive expeditions against the Kamerun natives. No other power in Africa has waged such a war against primitive blacks as that which, in two years, nearly exterminated the Hereros (Bantus) of German South-West Africa. . . . In other respects, however, and chiefly along the lines of scientific development, Germany has excelled all other colonial powers in Africa. She has carried on scientific surveys upon which are based the maps of parts of her large territory, maps that are unsurpassed and rarely equalled by those of any other of the colonial powers."

Mr. Adams goes on to point out that the German surveys have shown that the lands concerned are much richer than was at one time believed. Thus in German South-West Africa gold, diamonds, and other minerals are abundant, and there are large areas of agricultural and grazing lands in the north, while the eastern region has lands which can be reclaimed by irrigation, and the climate is so well suited for white settlement that at the time of its conquest last year the colony was found to contain 15,000 German farmers. In German East Africa the agricultural possibilities and the distribution of mineral resources have been carefully studied, and the cultivation of sisal fibre has been extensively developed, while gold has been discovered. Toga produces much oil, rubber, cotton, as well as palm kernels. German East Africa Mr. Adams regards as the most valuable of the German African colonies.

America.

Aridity and Humidity Maps of the United States (*with Sketch-Maps*).—Mr. Mark Jefferson publishes in the March issue of the *Geographical Review* an article on this subject, illustrated by the two maps which we reproduce here. The maps are an attempt to represent in a simple fashion the rainfall of the United States in so far as it conditions human life there. Mr. Jefferson considers that in the States mean annual rainfalls of 20 and 80 inches may be regarded as critical quantities, because they mark in a rough way the upper and lower limits

FIG. 1.—The arid regions of the United States. Scale 1 : 25,000,000. (For detailed explanation see text.)

of the precipitation suited to agriculture without irrigation, and thus of the area where dense population is possible. He regards a mean annual fall of 20-40 inches as sufficient, one of 40-80 inches as abundant, one of over 80 inches as excessive, and one of under 20 inches as scanty. The two diagrams illustrate the arid and humid areas of the States as defined in this fashion.

Fig. 1 is an aridity map. Here the regions of greatest aridity, having less than 5 inches mean annual fall, are coloured black. These regions may be regarded as desert, and cover some 35,000 square miles. They are almost wholly contained in south-eastern California, and include Salton Sea, now fast drying up, and Death Valley, which form the lowest surfaces on the continent. The next area is shaded by ruled lines. Here the precipitation is from 5-10 inches per annum, the country is distinctly arid, and agriculture is dependent upon irrigation.

The prospects for the future here are not hopeful. The area included covers about 250,000 square miles, and is made up of patches lying between mountain ranges, as between the Cascades and the Northern Rockies, the Sierra Nevada and the Wasatch, and the Colorado Rockies, the Coast Ranges and the Sierra Nevada in California, and also among the ranges in Montana and New Mexico. Finally, an area of about 720,000 square miles, shown on the map by dots, has a rainfall of 10-20 inches, and forms the lower portions of the great plateau on which stand the Rockies and the Basin Ranges between the 100th meridian and the Sierra Nevada and Cascades. This region may be described as semi-arid. Portions of it in the north can be used for dry-farming, while smaller parts both in the north and south can be irrigated. This forms the most promising part of the arid regions of the States, and is the chief region left where future expansion of cultivation can be hoped for.

Figure 2 is a humidity map. Here the arid lands of the first map are left blank, and the black areas mark the regions with excessive rainfall, *i.e.* over 80 inches per annum. These areas lie on the northern Coast Ranges and on the Cascades, with a small area on the Sierra Nevada, and form a total about half as large again as the region of desertic rainfall. The chief future importance of such areas lies in their capacity to supply abundant water-power. The area of abundant rainfall (40-80 inches) is marked by ruled lines, and covers nearly 1,000,000 square miles in the south-east, on the Atlantic coast, in the Pacific coast valleys, and on some of the higher ranges of the Rockies. The dotted area shows that of sufficient rainfall (20-40 inches), and covers about 1,000,000 square miles in the Great Lakes region, the prairies of the western part of the Mississippi valley, and the Rocky Mountains. In these two regions, but especially in the latter, live the great mass of the American people. In the latter are to be found most of the farms and the majority of the great cities of the States. As regards the cities, however, it must be noted that other factors, especially mineral deposits, position, and so forth, have probably as much to do with the matter as rainfall.

FIG. 2.—The humid regions of the United States. Scale 1:25,000,000. (For detailed explanation

Polar.

The Shackleton Antarctic Expedition.—According to an official announcement issued towards the end of July, "in view of the possibility of the failure of the third attempt now being carried out by Sir Ernest Shackleton in a small vessel to rescue the twenty-two men of his party left on Elephant Island, South Shetlands, and at his most urgent request the Government have decided to despatch a vessel from England as soon as she can be fitted out, no suitable wooden vessel being available in any South American port. The Governor and Company of Adventurers of England trading into the Hudson's Bay have most generously placed their vessel, the *Discovery*, which was specially built for Antarctic exploration, at the disposal of the Admiralty for as long as she may be required for this service, free of all cost.

"Lieut.-Commander James Fairweather, R.N.V.R., an experienced ice master, has been appointed to command the vessel, which is fitting out at His Majesty's dockyard, Devonport. On her completion, if news has not been received of a successful issue of Sir Ernest Shackleton's present attempt to reach Elephant Island, she will then proceed to Elephant Island, embarking Sir Ernest Shackleton on her way. It is anticipated that she will have no difficulty in reaching her destination, and it is to be sincerely hoped that she will successfully accomplish the rescue of the stranded party."

On August 4 a telegram from Port Stanley brought the not unexpected news that Sir Ernest Shackleton's third attempt at rescue in the schooner *Emma* (cf. p. 390) had failed. The ship encountered heavy gales and ice, and was badly knocked about, her engines being so injured that she had to proceed under sail. She found it impossible to drive through the pack ice north of Elephant Island. In the telegram announcing his failure Sir Ernest Shackleton stated that he proposed to wait for the *Discovery* before doing anything more. The *Discovery* is now on her way to Port Stanley.

Swedish Expedition to Spitsbergen.—According to a note in *Nature*, a party of thirty men, headed by Mr. Birger Johnsson, left Sweden in July last in order to work the coal deposits at the head of Bell Sound (Braganza Creek) and Isfjord, Spitsbergen. The coal at Braganza Creek, which is of Tertiary age, is said to be of good burning quality, and there is an average thickness of 2·15 metres over an area of about 100 kilometres. At the head of Isfjord, on the other hand, the coal, though of Carboniferous age, is not so good. The two areas are believed to be capable of yielding 3,000,000,000 tons of good coal. The members of the expedition include Mr. S. Öhman, who is to do mapping work, Mr. E. Lundström, who is to act as botanist, and Mr. Erik Andersson, a palaeontologist. Mr. Lundström is taking with him various plants which he hopes may be acclimatised. These include various willows, dwarf birch, *Cerastium alpinum*, *Potentilla fruticosa*, and *Papaver nudicaule*.

General.

The Cultivation of the Vine in the Ancient World.—A note in *La Géographie* summarises a recent monograph by M. Raymond Billiard on this subject. The author shows that while the genus *Vitis* can be recognised in early Eocene rocks, the grape vine was much later in making its appearance, but is met with in deposits of Quaternary age in Japan, across North America to Alaska, in Greenland, and throughout Europe from Iceland to Italy and Greece. Thus it is undoubtedly indigenous in the region where it is at present cultivated. Indications of the presence of the vine have been found among remains of Neolithic age, in six localities, ranging from the valley of the Escaut to North Italy, but it is not till the bronze period that grape stones become common in connection with archæological deposits, especially in Italy. The cultivation of the vine and the making of wine seem to have spread from Armenia into Thrace, Egypt, Greece and Italy, together with the rest of Europe, during the period of the great migrations, and a line drawn from the Sea of Aral to the Persian Gulf seems to mark approximately the eastern limit of the cultivation of the grape in ancient times, just as it does at present. To the east of this line the records of its presence are few and somewhat uncertain, while to the west of it in early times the vineyards became more dense as one approached the margin of the Asiatic continent and the country of Hellas. In early times the tendency was for the plant to be cultivated especially on the margin of the Mediterranean. Thus Phœnicia, though relatively poor in wheat, had freight to hand for her ships in the wines produced in the vineyards which clothed her seaward slopes. These wines were exported, by sea or by land, to Egypt, Arabia, Persia, India, and elsewhere. Round Asia Minor, both on the Euxine and Mediterranean shores, vineyards were numerous, and their produce was exported. In Africa the vine was only important in Egypt and Roman Africa, in the former country especially in the delta and in the Fayum depression. But it was in Europe, and first of all in Hellas, especially the islands, that the cultivation of the plant reached its highest development. It was the Greeks who introduced the plant into Sicily, whence it spread to the whole of Italy, and finally to the Narbonnaise. On the other hand, it was not till the time of the Roman domination that the shepherds and warriors of eastern Gaul became vinedressers. In this case the line of entrance was by Marseilles and the Rhone valley, and Lugdunum, at the junction of Saône and Rhone, was the great wine market, receiving wines from the Narbonnaise, from Marseilles, from Italy, and exporting them to other parts of Gaul and to Germany, where Treves was the principal market. By the second century of our era the plant had travelled northwards to the Moselle valley and the Palatinate, while the Romans carried it also to England, where its cultivation persisted till the twelfth century. About 146 B.C. Italian wines had definitely acquired supremacy over the Greek products, and in Italy the great wine ports were Ostia, the port of Rome, and Aquileja on the Adriatic.

Recent Progress in Meteorological Theory.—Sir Napier Shaw, F.R.S., delivered before the Royal Institution, in March last, a discourse entitled, "Illusions of the Upper Air: a Review of Progress in Meteorological Theory in England since 1866," which is summarised in the issues of *Nature* dated April 27 and May 4. The summary is somewhat abstruse and technical, but it may be said that the author begins by describing the views in regard to cyclones and anticyclones held by meteorologists till the end of last century. He then points out that since 1896 investigation of the upper air has become possible by means of kites and balloons, and has led to the division of the atmosphere into the two layers of the troposphere, where convection occurs, and the stratosphere, the upper layer in which there is no convection. The result has been that many views previously held are now shown to be illusory, as indicated in the paragraphs quoted below:—"We cannot resist the conclusion that the pressure differences of cyclone and anticyclone are not local effects at all; we must seek their origin in the upper air, where there is no convection. They are little affected by the lower stratum of 9 kilometres, which, roughly, marks the range of the effect of heating at the surface. The idea of warm air in the lower layers causing the low pressures which are recorded on our barometers is therefore an illusion. Thus it will be seen that the observations of the upper air have proved that all the vital parts of the facile description which was the accepted theory of cyclones and anticyclones are quite illusory. What it took for guidance in forming a picture of the structure was the accidental character of motion near the ground. We now feel that the motion of air in the lowest kilometre had better be disregarded, or, better still, be handed over to students of turbulent motion, while we, as meteorologists, consider the normal state of the atmosphere as motion under balanced forces. Instead of a natural flow from high pressure to low pressure, we have a natural flow without any change of pressure: the motion of a heavenly body round its sun is taken as the type for air instead of the motion of a falling stone.

"While we are considering illusions, let me add another example depending upon what was at one time, and possibly is still, a commonplace of physical teaching in regard to the relation of barometric changes to weather. It is this: moist air is lighter, bulk for bulk, than dry air, and consequently pressure is low where the air is moist. That is why a low barometer is indicative of rain: the moist air causes the low pressure. This is not true to fact. Mr. Dines has recently examined the correlation between the humidity of the troposphere and the pressure at the surface. The coefficient is quite insignificant: there is no relation between moist air and low pressure on the map.

"But if the ideas which were common in meteorological practice fifty years ago are now to be regarded as illusory let us consider what we have in their place. We go back to the three elements: the circulation, the convergence, and the convection. As to the circulation, we now think of it as it is exhibited in the upper air, and instead of regarding it as an incidental disturbance of the motion from high to low, we regard it as the foundation of atmospheric structure: as the motion of air

which is persistent because the pressure-gradient is balanced by the centrifugal action of the earth's rotation, which we may call the geostrophic component, and of the curvature of the path over the earth's surface, which we call the cyclostrophic component. . . . We no longer picture to ourselves the air being somehow held firm without moving until a pressure distribution is set up, and then let go. . . . The whole history of the general motion of the atmosphere is the story of the constant pursuit of the strophic balance, the adjustment of velocity to pressure, constantly disturbed by infinitesimal changes. . . . We must therefore regard the general flow of air, except in so far as it is disturbed by convection, as governed not by what happens at the surface, but by what is imposed upon it from the stratosphere above. It is from there that the general control of the distribution of our pressure comes. It is only modified by what happens below. The upper air, the stratosphere, is the operator, and the lower air the subject operated on."

Geographical Science in France.—In connection with the San Francisco Exhibition the *Ministère de l'Instruction publique et des Beaux-Arts* at Paris published, in two volumes, a monograph entitled *La Science Française*, of which a copy has recently reached us. The book is devoted to an account, with bibliographies, of the work done by France in connection with the various sciences, and it has a dignified preface by President Poincaré. One section is devoted to Geographical Science, and it seems worth while to summarise here some of the paragraphs which have a direct bearing upon educational problems in this country.

The section is by Professor Emm. De Martonne, himself a famous geographer, and he considers his subject in three periods. In the first period, that included in the seventeenth and eighteenth centuries, he points out that in France, as elsewhere, Geography in the modern sense did not exist. But during these centuries French *savants* were keenly interested in mathematical and historical Geography, and the most striking event of the period was the publication, in 180 sheets, in 1746-1815, of the topographical map of France on the scale of 1 : 86,400. The stress laid during the period upon mathematical Geography, however, as M. De Martonne points out, had a somewhat retarding effect upon the development of Geography proper. At the same time it explains what seems at first sight the somewhat anomalous fact that in the Institute of France Geography is only represented in the section of mathematical sciences at the Academy of Sciences. The result, in Professor De Martonne's words, "of this camping upon the ground of mathematical and historical studies was to render French Geography scientific and precise, but not very attractive, and but little known. It was the great discoveries, brought to popular attention by the Geographical Societies, which began to alter the situation." In the eighteenth century the great voyages of circumnavigation were taken part in by eminent Frenchmen, and with the nineteenth century began the exploration of the interior of the continents and the second period of French Geography. French explorers were especially associated with Africa. The Geographical Society of Paris, founded in 1821, both published the

results of the French travellers, and entered into personal relations with them. The founding of numerous other geographical societies followed.

But up to the last years of the nineteenth century the work of the geographical societies has as its chief result "to make known the name of Geography, rather than to make precise its object and its method." Outside of the activities of the societies, the chief geographical works published still for the most part belonged to mathematical or historical geography. The actual foundation of a distinctly French school of geography in the modern sense did not come till nearly the end of the nineteenth century, and it is of interest to note Professor De Martonne's definite statement of the part played by university teaching in founding such a school. "To group the workers together, to impose upon them a scientific discipline, to co-ordinate their efforts with a view to realising a definite programme, is a piece of work which can only be accomplished by a University faculty, with full control of all its means of action." We would emphasise the statement as having a very definite lesson for us in this country.

For long only Paris and Lyons had chairs of geography, while the creation of laboratories or institutes of geography in all the French universities only dates from a few years back. "It is easy to understand why geography, more than any other intellectual discipline, has need of university organisation, if we reflect on the variety of problems which it has to attack once it ceases to be purely cartographical and historical, and once it aspires both to describe and to explain the aspects of nature. It has to appeal to the results of the physical, natural and social sciences, and must, nevertheless, if it desires to preserve its individuality as a science, have its own method and its own orientation."

There follows a summary of the work which has been done by the modern French school, emphasising the predominant part played by descriptive geography, regional geography, and human geography, but we have indicated here so continuously in recent years the kind of work being done by French geographers, that the summary contains little which has not been already discussed here. But the statement that it is essential that geography be organised from the universities before it can hope to prosper in any country, seems a lesson worth repeated emphasis here.

NEW BOOKS.

EUROPE.

Some Experiences in Hungary, August 1914 to January 1915. By Mina Macdonald. London: Longmans, Green and Co., 1916. *Price 3s. 6d. net.*

It is sad to think that the Hungarians, with whom the British were so popular before the war, owing to our support of their hero Louis Kossuth, should now be numbered among our enemies. The reason for this change was pithily expressed by a Pan-Slav doctor, who placed Miss Macdonald in charge of an improvised hospital: "It's all the fault of that puffed up, vain-glorious peacock in Berlin! It

was he sent that ultimatum to Serbia," adding, "One must really say it serves William right: he's getting it hot everywhere."

Miss Macdonald's story, which is as interesting and lively as a novel, opens when she is staying, in August 1914, as companion to the two daughters of a Hungarian prince in his magnificent old Schloss among the White Carpathians on the borders of Moravia. A friend brings news of the assassination of Franz Ferdinand and his wife, whereupon the prince remarks that both were the best hated people in Austria. When Britain declared war, the Vienna and Berlin newspapers expressed the opinion that "England had been behind the whole conflagration; that, jealous of Germany's dangerously increasing foreign trade, she sought to cripple it by a war, and accordingly it was at England's suggestion that Russia bribed the Serbs to assassinate the Archduke—an event which the Entente felt would certainly force Germany's hand." Miss Macdonald found that she was the only inmate of the Schloss (which contained many Slav servants) who disbelieved these monstrous assertions. She was, however, allowed to walk, with her camera, quite openly over the hills, and had no trouble with her mails, although foreign correspondence was forbidden to enemy aliens. She received and sent English letters through Rome. Italy's delay in declaring war on the side of the Triple Alliance made Vienna furious, and occasioned there the popular riddle, "Was ist der Dreibund? Ein Zweibund und ein Vagabund."

Next month (September) the Russians had taken Lemberg, and wounded Austrian soldiers came pouring into Hungary, including several Slovenes, who complained to Miss Macdonald (who was serving in a hospital) that they were forced to fight against their own race. "If only our officers would be decent; but they shoot us from behind if they think we're slack with the Russians. There are awful things happening in Galicia, and it's not good to be a Slav in Austria." An Austrian officer back from the front said that the Russians "were good soldiers, honourable fighters, and treated their prisoners with every possible consideration and kindness; they were splendidly equipped and fed, and were wonderful shots."

In November more wounded soldiers came to the author's hospital, including some Rumanians from the Bukovina. She says they "were thoroughly miserable and discontented, vexed at having to fight on the side of the hated Austrian," and horrified to find that a wounded Turk was considered an ally of the Austrians. "The times on which they had fallen were indeed evil," they said, "to fight with the Turk against the Russian."

In December the author visited Vienna and found its atmosphere much gloomier than in Hungary, where Kaiser Wilhelm was expected to save their land from the enemy. "In Vienna it was otherwise, and the Kaiser's name got a cold reception from the Viennese, who blamed him for taking advantage of their old Emperor's dotage to lead them into this quagmire. The streets were literally swarming with wounded soldiers, and every public building seemed to have become a hospital." Next month (January) Miss Macdonald was allowed to leave Austria, and returned *via* Switzerland to England. Her well-written book contains numerous reproductions of photographs taken in Hungary.

ASIA.

The King's Indian Allies: The Rajas and their India. By St. Nihal Singh. London: Sampson Low, Marston and Co., Ltd., 1916. *Price* 7*s.* 6*d. net.*

Mr. Singh is a prolific journalist and writer of books on Indian and Oriental subjects. This latest publication is the complement of an earlier work on *Progressive*

British India. In *The King's Indian Allies* we have an account of the part of India under Indian rule, amounting in population to nearly one-third, but in area to more than two-thirds of British India. Mr. Singh, himself an Indian, is a thoroughly well-informed student of India, which is more than can be said of all Indian writers and speakers on India. His motive—all will wish him success—is to correct the prevailing notion that the Rajas' India is to be thought of mainly as "the gorgeous East, which with richest hand showers on her kings barbaric pearl and gold," and where the "wealth of Ind" is wasted by "the Rajas" on personal indulgence and old-time barbarous sports. We welcome this contribution to the interpretation to Britain of a less familiar part of the great continent whose destiny is linked with ours. The most valuable portion of the volume, perhaps, is that which sets forth the mutual relationships of the Indian States and the Imperial Government.

The volume does not profess to be a detailed precise study in any sense. Profusely illustrated with portraits of many of the Indian Rulers of India, the volume forms a very pleasing table-book, and is professedly for the general reader, "no attempt being made to treat of individual States or Rulers." In place of chapters on separate States or Rulers, the information collected is sifted into chapters dealing with subjects common to all the States, *e.g.* "The Private Life of the Rajas," "Touches of Westernisation," "The Passing of Pomp," and the like. As the autocratic rule of "the Rajas" justifies, the subject is treated largely from the point of view of the personality and court-life of the Rulers. The main impression and the truest impression conveyed is that of the great differences in the political importance, the personal tastes and the degree of modernisation of the several "Rajas." A criticism of the book and its method might therefore be that its generalisations are almost bound to be misleading. An impression is given that the India of the Rajas is being largely permeated with modern liberal ideas: that the impression and the facts accord, one is hardly satisfied. Very justly, however, Mr. Singh infers from the variety how many and complicated must be the problems between contiguous States and between the various Indian Rulers and the central British Government. Yet to the credit of all the parties alike, the ordinary student of India is scarcely conscious that such problems exist.

Travels in the Middle East: Being Impressions by the Way in Turkish Arabia, Syria, and Persia. By Captain T. C. Fowle, 40th Pathans. London: Smith, Elder and Co., 1916. *Price* 7*s.* 6*d. net.*

As the sub-title indicates, this volume makes no claim to be what one may call a serious volume of travels. To produce a readable description of what it is like to be "on the road," in Robert Louis Stevenson's sense of the phrase, and that road one of the unfamiliar byways of the earth, is the author's motive. Where he has no vivid impression or interesting incident to record, he simply skips that bit of his road. Such was the fate, for example, of the sacred city of Meshed and of Teheran itself, as the author unblushingly confesses. Be it acknowledged with gratitude, he has produced an eminently readable book and given us some clear impressions of the peoples and lands he traversed. Impressionist word-pictures interspersed throughout the volume reproduce most vividly a number of characteristic scenes. The coffee-house at Baghdad and its *habitués*, the author's reception by the Bedouin successor of "Jael, the wife of Heber the Kenite," who for the weary traveller "brought forth butter in a lordly dish," the baths at Damascus, the passing of a caravan in the desert at night, the celebration of the Mohurrum at Gunabad, may be mentioned as set pictures in the panoramic film. But everywhere the author has an eye for an effective touch, and the literary skill, spiced

with humour, to delineate it effectively. Regrettably, we feel, Captain Fowle eschews political observations. A blemish is the frequent inconsistency in the spelling of geographical names between the text and the "map to illustrate" the Travels. An oriental, when asked how he spells his name in English, may reply, "It does not matter," but when once an English author has committed himself to a spelling of an oriental proper name, he should stick to that form, at least within the same book. A bad case of inconsistency is "Kerbela"—so, in the earlier portion of the text and in the map—which appears as "Kerbala" once at least in the text, and regularly as "Karbala" in the second part of the text. Both "Kerbela" and "Karbala" appear in the Index as if they were different places. The "Nasratabad" of the text appears only as "Nasirabad" in the map. Seistan, frequently mentioned in the earlier chapters of the Travels, does not appear in the map at all, the lake of the same name, however, figuring properly enough, in text and map, as "the Hamun."

GENERAL.

The Statesman's Year-book: Statistical and Historical Annual of the States of the World for the year 1916. Edited by J. Scott Keltie, LL.D. Assisted by M. Epstein, M.A., Ph.D. Fifty-third annual publication. Revised after official returns. London: Macmillan and Co., 1916. *Price* 15*s*.

It is noted in the preface to this issue that, in spite of the war, more recent statistics, especially in regard to Germany, have been obtained than might have been expected. Necessarily, however, in most cases the figures given for European countries refer to the last pre-war year. The book has thus in large part an air of unreality which seems to bring home the tragedy of the world war more acutely than could have been supposed possible in view of our benumbed perceptions. These glimpses of a world engaged in peaceful commerce have the strangeness of a dream, and it is impossible to turn the pages without speculating upon the nature of the changes which will appear in that first post-war Year-book, which still seems so remote. Will the streams of trade flow once again back into their old channels, geographical features regain their old influence, or will the war act like some catastrophic earth-force and remake the surface of the civilised world? The statistics and facts in regard to the years 1914-16 scattered through the book quite possibly contain the answer to these questions, but he would be a bold man who would attempt to interpret them meantime.

In addition to its picture of the ante-bellum world, the book contains much information of current interest, not only for those parts of the world more or less remote from the contest, notably the United States of America, but also in regard to the war and its effects upon the Allied, and, to some extent, upon the enemy nations. The four maps all bear upon war problems, the most interesting being two which deal respectively with the distribution of Germans throughout the world in 1914, and with the proportion of natives of Germany to the total population of the United States in the same year. The latter map emphasises the number of Germans in the district lying immediately to the west of the Great Lakes, especially in the states of Wisconsin and Minnesota, and also their number in the state of Texas. A striking feature of the other map is its demonstration of the tendency of Germans to settle in British territory, notably in Queensland and South Australia, in Canada, and in South Africa; their virtual absence, on any considerable scale, in Argentina is another remarkable feature.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE MAPPING OF THE EARTH—PAST, PRESENT, AND FUTURE.[1]

By Edward A. Reeves, F.R.A.S., F.R.G.S.

(With Plates.)

We meet to-day under exceptional circumstances. The Great War is affecting us all; those of us who are not actually engaged in it find that our lives are more and more under the influence of the struggle that is now taking place, and are being called upon to do what we can to carry on the work of the men who have gone, as well as our own. This is the explanation of my presence here to-day. Mr. D. G. Hogarth, who was to have been our President this year, has been compelled to resign owing to his absence from England on important military duties; and a week or two ago I received a letter from the Secretary of the Association asking if I could help our Section out of the difficulty in which it was placed by agreeing to take the chair during the meeting. Well, there seemed nothing else for me to do but accept, so I am here, and will do the best I can to fill the gap. With your kind indulgence, and the invaluable help and guidance of the recorder, secretaries, and committee, I trust we shall manage to get through somehow without bringing discredit on ourselves.

You will understand that, as the notice was so short, I have had no time to prepare an address such as I should like to place before you; and that which I shall now give has been hastily put together during a few days' holiday at the seaside, from notes and jottings I have recently made for other purposes, combined with such remarks as I feel may be

[1] Presidential Address delivered to Section E at the Newcastle Meeting of the British Association, September 1916.

appropriate to the circumstances and conditions under which we meet.

This is a great testing time—a crisis in our history when theories are put to practical trial, and I fear many of them will be weighed in the balance and found wanting. Scientific training is specially being tested, and almost every branch of human knowledge has, either directly or indirectly, been called upon to do its utmost in connection with the Great War. This is no less true of surveying and geography generally. There has always been of necessity a close connection between military operations and map-making, and it is not too much to say that one of the essential conditions of successful warfare is a good and accurate knowledge of the geographical features of the theatre upon which the operations have to be carried out. Many a battle has been lost in the past, as we ourselves know to our cost, through imperfect topographical or geographical knowledge. The South African campaign, without referring to any others, produces more than enough evidence of the serious results ensuing from imperfect maps; and at the present time the general staffs of all combatants seem more than ever alive to the importance of this subject.

There are various ways in which this war will affect the map-maker; not only will new boundaries have to be surveyed and laid down, but outside of Europe districts will have to be mapped of which little information has hitherto existed; so that, after all is over, our present maps and atlases will be out of date, and the publisher will find himself called upon to produce new ones.

It therefore appears to me that this is a suitable occasion for taking stock of our position, and I will endeavour to give you:

(1) A brief general summary of what has been done in the past towards the mapping of the earth's surface;

(2) a sketch of how things stand at the present time; and

(3) finally add a few remarks upon future work, specially as regards instruments and methods.

You will perceive at once that this is a large subject, and in the time at my disposal I shall only be able to deal with it in the briefest possible manner.

The acquirement of knowledge has always been progressive, sometimes moving slowly, at others more rapidly, but ever advancing: and this is specially true of the subject we have to consider. Our present knowledge of the earth, its form, size, the configuration of its surface features, their measurement and representation on maps as we see them to-day, are the result of many centuries of strenuous endeavour and conquest over obstacles, and at times almost insurmountable difficulties, the record of which constitutes a striking monument to indomitable courage and perseverance such as cannot be excelled in the history of mankind.

Of all branches of human research and discovery that of geographical exploration and representation of the surface features of the earth is doubtless one of the oldest: in fact, it is difficult to imagine a time in the history of intelligent man when it did not in some manner or other

exist. The earth's surface is, by the nature of things, man's present dwelling-place, and, however high and far he may soar in imagination and thought, as to his bodily presence his movements and operations are practically restricted to the crust of the comparatively small planet he inhabits. By his very nature man is an adventurer and a restless wanderer; and, since his physical constitution does not permit of his travelling more than a comparatively few feet vertically, his only chance of expansion is laterally or horizontally; and geographical investigation and measurement become a natural consequence.

From the earliest days there would arise the need of some sort of plans and maps; there would soon be boundary questions to settle, and the limits of pasture-lands; and irrigation rights, mining-claims and other matters would call for maps of some kind, however rough they may have been; so it is quite impossible to say when surveying commenced. It certainly must be one of the oldest departments of knowledge, and, like all others, has slowly advanced as the centuries have passed and greater accuracy was required until it has reached the refinement and precision of the present day.

Probably the earliest attempts were those which naturally resulted from the necessity of representing in some kind of plan the limits of private property, and several interesting examples of this have been brought to light during archæological investigations and discoveries in Egypt and other ancient sites.

A careful reader of the account of the dividing of the land of Canaan among the tribes of Israel can hardly fail to come to the conclusion that Joshua had some sort of a map of the land before him when he proceeded to apportion the various districts, the boundaries of which are so minutely and carefully described; and it is also more than probable that he and others who had been sent beforehand to spy out the land "had in view quantity as well as quality," as Gore says in his *Geodesy*, which implies some kind of rough survey and sketch-map.

At a later period we have the vision of the man with the measuring line in his hand, measuring out his thousands of cubits, apparently much as a chainman does his work to-day.

So long as the district concerned was of no great extent there could have been little difficulty about making a rough plan or map of it. For lineal measurements the most natural units would be the lengths of various parts of the human body: the cubit, the pace, the foot and the span were evidently amongst the earliest standards of all, and most of these have remained in use until this day. With these, and an elementary knowledge of some of the simpler geometrical figures, it would be easy for quite useful plans to be constructed, as indeed we know was the case.

The longer distances were reckoned by the time it took to travel from one place to another, days' journeys, etc.; and later on in stadia, of which it is generally assumed that there were 600 to a degree according to the ordinary Greek measure.

When distinctive features were visible it would be comparatively easy to map roughly a route travelled, much as a man in the present

day can make an approximate sketch to show any journey he has taken, even without a compass or other instruments: or natives have been able to draw rough sketches to explain to explorers the direction of any coastline or course of a river. One of the most recent examples of this is the map reproduced by Mr. Beaver, which was drawn in sand by a native of Papua to show the relative position and names of the various tributaries of a river he was exploring (see *Geographical Journal*, April 1914).

Long before the magnetic compass was known, at any rate in Europe, navigators and travellers had to find their way somehow, often through little known regions, and when they had no landmarks to direct them, would have to seek some other means of guidance. Early nomad peoples of the desert would soon become acquainted with the heavenly bodies and their general movements and positions, and would naturally turn to them for the guidance they sought. Their positions at certain times and seasons would, through being continually observed, become quite familiar, and so, doubtless before any instrumental astronomical observations for fixing positions were made, men learned to march and steer their ships by the sun by day and the stars by night. It is interesting to note that the art of marching by stars has been considerably revived in the last few years, specially in the rapid movement of troops at night.

So long ago as the seventh century B.C., Thales had taught the Ionian sailors to steer by the Little Bear, as did the Phœnicians.

One of the most interesting exploring expeditions of ancient times was that of Pytheas, the discoverer of Britain, in the fourth century B.C., who had not only learnt to sail by the stars, but to determine the latitudes of points throughout his voyage by astronomical observations, made with a gnomon or sort of sundial, with which he seems to have fixed the latitude of Marseilles with far greater accuracy than might have been expected.

The gnomon used by Pytheas was probably of the earlier form, which consisted merely of an upright rod in the centre of a flat disc; but Aristarchus, in the third century B.C., introduced a decided improvement in the design of this interesting old instrument, which deserves to be borne in mind by all surveyors, since it seems to have been the first by which angles could be measured directly without computation. He substituted for the flat disc, or plate, a hemispherical bowl, in the centre of which an upright rod was fixed equal in length to the radius of the bowl. Concentric equidistant semicircles were drawn on the interior of the bowl, which became a scale for the direct measurement of angles of altitude as indicated by the shadow of the rod or gnomon.

The voyage of Pytheas is of special importance, since it shows that even at that early date serious attempts were made at carrying out geographical exploring expeditions, by sea at any rate, on scientific lines.

The first record of anything that could be considered as the beginning of geodetic surveying was the well known attempt of Eratosthenes to ascertain the size of the earth by the measurement of an arc of the

meridian. This wonderful old philosopher was born in Cyrene in B.C. 276, and was so noted for his learning that he was put in charge of the famous library at Alexandria. The method he adopted was much the same in principle as that upon which geodesists at the present time work, but it seems impossible to say how near the truth his results were, as there is a doubt as to the length of the stadion he used.

The subject of the true form and dimensions of the earth is a most important one in many respects, and considerably affects survey questions, since it must form the basis of all exact measurements on the earth's surface. Right on to the present day geodesists have been working at it, and although they have brought down the probable error in the measurements to what must be almost a minimum, yet even now the question cannot be taken as finally settled.

As regards the maps of very early date, it has always been a question as to how far they were the outcome of mere information collected by travellers without any attempt at instrumental measurement, and how far they were based upon some kind of route-surveying and astronomical determinations. At sea, as has been shown, occasional observations were made to determine latitude, but the actual charting of the coastline, it is more than probable, was sketched in in the roughest possible manner, with little assistance from any kind of instruments. After repeated voyages the navigators would naturally obtain some acquaintance with the general configuration of the coastlines and be able to draw a fairly accurate chart. These rough sketches were sent from one to another and copied by hand by cartographers; so in course of time quite a good representation was produced. It is indeed remarkable how accurate some of these old charts were. A rough latitude could always be obtained from observation, but it was quite another thing with longitude. Even at the present day there is far more uncertainty about a longitude observation than a latitude, and in early days, before the construction of accurate chronometers, to obtain the difference of time or longitude between two places was a problem which could not be satisfactorily solved with the rough instruments and tables available. Consequently the longitudes on early maps were, as a rule, very wrong. They were generally much too great, as the tendency was, as it is indeed at the present time, to exaggerate the distance travelled.

As might be expected, now and then serious mistakes seem to have been made in the fitting together of sections of charts received from various sources. This was probably due to the fact that in many cases they were rough copies from other copies of the originals, and, with no proper means of settling the orientation, the chart would, as likely as not, be fitted on to another at quite a wrong angle. This is doubtless the explanation of some of the grosser errors on many of the old maps. For instance, in the early editions of Ptolemy's maps, 1462(72)-1490, to the north of England there is a remarkable mass of land running something like east and west, and projecting a long way in the former direction. This is, of course, meant for Scotland, but it is difficult to see how it could have got so wrongly drawn. Yet if you suppose the whole mass turned round at right angles, so that the part that goes to

the east is placed to the north, you get a much better representation. There seems little doubt that somehow or other the whole thing has got wrongly joined on to England. In later editions of Ptolemy it was corrected.

The best known of all the old instruments is the astrolabe, which is generally supposed to have been invented by Hipparchus about 150 B.C. Ptolemy, and many others after him, introduced modifications in it, some of which were doubtless improvements, while others, as is the case with many so-called improvements in more modern instruments, were of doubtful value or merely unnecessary encumbrances. Divested of all elaborations, the astrolabe consisted of a somewhat heavy metal ring suspended from the thumb, or, in the case of the larger instruments, hung on some form of tripod arrangement. Pivoted at the centre was the movable sighting rule or alidade, and the altitude of the sun or star was read off on the graduated circle round the circumference of the disc.

During the mediæval ages things were at a standstill, or rather went backwards, as regards all scientific pursuits, at any rate in Europe. This in a special manner affected geography and map-making. The advance that had been made by the Greeks was arrested, and the knowledge they had gained was lost sight of; instead of maps being improved by more accurate surveys of explorers and travellers, they were frequently drawn in monasteries by monks from imagination, more or less distorted by religious bigotry. Cartography fared somewhat better in the hands of the Arabs, but many of the maps seem to have been constructed under the impression that the outlines of all parts of the world must be formed by straight lines and arcs of circles, drawn with a ruler and compass, so that they are of little real value. There were, however, a few notable exceptions.

It was not until the latter part of the fifteenth century, the time of the great Portuguese and Spanish discoveries, that any real advance was made: but then Europe seemed to awake from a long sleep, and a grand new start was made.

One of the first acts of King John II. of Portugal (1481-95), whose memory deserves to be equally held in respect with that of his great uncle Prince Henry, was the calling together of the Committee, or "Junta," of learned men to consider the best means of finding the latitude when the Pole-star was too low to be of service, to decide upon the most approved form of instrument for the taking of observations, and to furnish suitable tables of declination, etc., for the computations. Equipped with the new tables, which may, perhaps, be considered the first Nautical Almanac, and the simplified astrolabe, the Portuguese navigators started on their famous voyages, with a much better chance of properly fixing positions than their predecessors. The vernier had not yet been invented, and so the difficulty of obtaining accurate readings of the circles was still considerable. To overcome this difficulty it was decided to construct astrolabes with very large circles, and the instrument carried by Vasco da Gama in his famous voyage round the Cape in 1497 had a circle which measured just over two feet in diameter. The

size of the instrument certainly made it unwieldy, and so it was necessary to suspend it from some sort of stand, which meant that it could not have been used with much success on board ship. Vasco da Gama seems to have been fully alive to this, and so we find him, when he arrived in St. Helena Bay, not far from the Cape, bringing his instrument on shore and fitting it up on a stand. His observation and method of obtaining the latitude of this spot is of considerable interest, and may perhaps be taken as a fair example of the kind of work that was then done.

The sun's meridian altitude measured was 76° 20′, which gave a zenith distance of 13° 40′. The declination found from the tables was 19° 21′ S., so by adding this to the zenith distance the resulting latitude was 33° 0′ S. I have recently tried to find out how near this was to the true latitude, but it seems to be difficult to say exactly where the instrument was erected. If we take the head of the bay as the spot, the error is apparently 13′, since the latest Admiralty chart gives 32° 47′ S. This error appears to be somewhat larger than might have been expected, but still, taking all things into consideration, it was not so bad after all. I have on several occasions made altitude observations with rough home-made instruments of the astrolabe type, to see what could reasonably be expected, and have found that with care it is possible to get a latitude with an error not exceeding 5′ to 7′, taking a mean of several readings.

The difficulty of taking anything like accurate observations at sea was for centuries a very serious one, and long before the invention of the reflecting quadrant or sextant many were the attempts to devise some instrument for accomplishing this.

Next to the astrolabe, and various forms of quadrants with a sighting arrangement and plumb-bob, the old cross-staff came into use. This consisted of two rods or pieces of wood at right angles to each other. The shorter piece had a hole in the centre, and was made to slide along the other. The eye was placed at the end of the long piece, and the sliding piece or cross moved along until one end of it cut the sea horizon and the other the sun. The altitude was then read off on the long staff, which was graduated for the purpose. This was essentially a seaman's instrument, and was in common use about three hundred years ago—in fact, until the famous old Arctic explorer, Captain John Davis of the sixteenth century, improved upon it by bringing out his "Back-staff," which enabled a man to take altitudes with his back to sun instead of half blinding himself by looking straight at it.

With instruments such as these only the roughest measures could be obtained, and it was not until the ingenious invention of the reflecting octant, suggested first of all by Sir Isaac Newton, that anything approaching accuracy was possible. Hadley's quadrant was the first of such instruments to be put into actual use, but there is no doubt that the idea should be ascribed to the famous Sir Isaac Newton, although the instrument was probably independently invented by Hadley.

With the invention of the sextant, or its predecessors the octant and quadrant, rapid progress was made in improvements in navigation and surveying instruments.

The introduction of the nonius by Peter Nuñez in the middle of the sixteenth century, and later of the vernier by the Frenchman Francis Vernier, which, owing to its simplicity, soon superseded the former, were of great importance, since it was no longer necessary to construct the enormous large arcs and circles which had hitherto been indispensable to give anything like accuracy.

The magnetic compass not only made an enormous difference in navigation and exploration by sea, since it enabled the sailor to launch boldly out into the unknown oceans with confidence, but it soon began to leave its mark on land-surveying and geographical exploration. Much has been written on the invention of the compass, and many have been the disputes upon the subject, but it was certainly in use in Mediterranean countries of Europe as early as the twelfth and thirteenth centuries. The date when it was first used for land-surveying is not known exactly, but in Europe it was probably about the early part of the sixteenth century.

For the filling in of the topographical features early forms of the plane-table, or their prototypes the trigonometer and graphometer, came into use in the sixteenth and seventeenth centuries. Besides these the surveying perambulator, much as is used at the present time, was a favourite instrument in measuring distances along roads, and many of the road maps of England before the Ordnance Survey were made by its means, combined with compass-bearings and circumferator angles.

It is supposed that Ptolemy was fully alive to the fact that it was not necessary to actually measure the whole length of an arc of the meridian, but that some parts could be computed, or perhaps graphically obtained, much as is now done in plane-tabling; but, so far as we know, the first to introduce triangulation from a measured base and angles was Willebrod Snell, a mathematician of the Netherlands, who lived in the seventeenth century. The account of his triangulation for obtaining the distance between Alkmaar and Bergen-op-Zoom, in Holland, is well known, and it is not necessary for me to refer to it in detail here; but its importance cannot be overestimated, since it laid the foundation for all future work. Much has been done in later years, but this has only meant the improvement of Snell's system, the perfecting of instruments for the measurement of angles and bases, and more refinement in the computations.

Of all the instruments used by the surveyor, there is doubtless none more important than the theodolite, which seems to have been first of all invented by Leonard Digges. His invention is described in his book on surveying, which was completed by his son and published in 1571.

There is an interesting old theodolite of much the same design in Bleau's famous Dutch Atlas of the latter part of the eighteenth century.

The "common theodolite," as it was called, since it had no telescope, carried by Mason and Dixon to the United States, and used by them in their survey of the boundary between Maryland and Pennsylvania in 1763-9, is now in the Royal Geographical Society's Museum. It was made by Adams of London, and was evidently only intended for observing horizontal angles. It resembles what is generally known as a circumferator more than a theodolite. The famous Ramsden theodolite,

which was used on the primary triangulation of the British Isles and later on in India, has often been shown in books, and doubtless many of you are quite familiar with its appearance. This has now found a resting-place in the Ordnance Survey Office, Southampton.

The surveying equipment of the pioneer explorer of early days, say, of from twenty to sixty years ago, usually consisted of a sextant and artificial horizon, a chronometer or watch, prismatic compass, boiling-point thermometers, and aneroid. With the sextant and artificial horizon the astronomical observations for latitude and longitude were taken, as well as those for finding the error of the compass. The route was plotted from the compass bearings and adjusted to the astronomically determined positions. The latitudes were usually from meridian altitudes of the sun or stars, and longitudes from the local mean time derived from altitudes east or west of the meridian, compared with the times shown by the chronometer, which was supposed to give Greenwich mean time.

The sextant, in the hands of a practical observer, is capable of giving results in latitude to within 10″ or 20″, provided it is in adjustment, but the difficulty is that the observer has no proper means of testing for centring and graduation errors.

The great drawback to the sextant for survey work is that it is impossible to take accurate rounds of horizontal angles with it, since, unless the points are all on the same level, the angles must be too large. It is essentially a navigator's instrument, and nowadays has been almost entirely superseded by the theodolite for land-surveying.

As regards the longitude, the difficulty was always to obtain a steady rate for the chronometer, owing principally to the unavoidable oscillations and concussions met with in transit. Formerly it was customary to observe lunar distances for getting the Greenwich mean time instead of trusting to the chronometers, but these, even with the utmost care, are very unsatisfactory.

In more recent years the occultation of a star method of finding the Greenwich mean time superseded almost entirely the lunar distance, but all of these so-called "absolute" methods of finding longitude are fast becoming out of date since the more general introduction of triangulation and wireless telegraphy.

Heights of land were usually obtained by the boiling-point thermometer or aneroid.

This then was the usual equipment of the pioneer. With such an outfit the greater part of the first mapping of Africa and other regions of the world was carried out, with results that were more or less reliable according to the skill of the explorer and the time and opportunities at his disposal.

In recent years considerable improvement has been made in the instruments and methods of the geographical surveyor: the introduction of the invar tape for the measuring of the baselines, the more general application of triangulation, the substitution of the theodolite for the sextant, the use of the plane-table for filling in the topographical details of the survey, the application of wireless telegraphy to the determination

of longitudes, these and other improvements have all tended to greater accuracy and efficiency in geographical and topographical mapping, so that in many respects the rough approximate methods of the earlier explorers are fast being superseded by instruments and methods more in keeping with modern requirements in map-making.

Still, the principle underlying all surveying is the same, and the whole subject really amounts to the best and most accurate methods of measurement with a view to representing on a plane, on a greatly reduced scale, the leading features of a certain area of the earth's surface in their relatively correct positions; and so it resolves itself into geometrical problems of similar angles and proportional distances. This being the case, it is clear that it becomes in the main a question of correct angular and linear measurements, and all the improvements in survey methods have had for their object the increased accuracy of accomplishing this, together with greater facility for computing the results.

What we do now is exactly what was attempted by the early Greek geometricians and others in ancient times, only we have far more accurate instruments. If, for instance, we compare our modern micrometer theodolite with the old scaph of the Greeks the contrast is striking, although both had the same object in view as regards taking altitudes of heavenly bodies. Many of the old instruments, in spite of their great size, were extremely rough, and the angles could only be read with approximation or to a great extent by estimation, while the theodolite, which is now generally used on geographical surveys, although it has circles of only five inches in diameter, can, by means of the micrometers, be read to 2″ of arc, or even to 1″ by careful estimation. This, when one comes to think of it, is a triumph of refinement, since it really means that we can measure to within about $\frac{1}{50,000}$ part of an inch, which is about the space occupied by 1″ on the arc of a circle of five inches diameter. At least this is the theoretical accuracy, but in practice there are, of course, errors in sighting, setting the micrometer wires, and those arising from other sources which have to be taken into consideration.

The continued striving after greater accuracy of measurement applies not only to angular measuring instruments, but to linear distance measurement as well: and the improvements in apparatus for this purpose, could we follow them in detail, would be most interesting. From the rough methods that would suggest themselves naturally to early intelligent men, and some of which I referred to in the earlier part of this address, to the modern baseline apparatus, and accurately computed sides of a geodetic triangulation, is a far cry, and the advance in this matter is certainly remarkable. What would the ancient geographers have said if they were told of the accuracy of a modern first-class triangulation, such as that of our own Ordnance Survey or of the Survey of India?

Still, absolute accuracy of measurement of any kind seems to be an impossibility, and the best we can do, after all, is to approach it as near as we can, and to arrange matters so that the inevitable errors will tend to balance one another. Nature herself seems to object to perfection in measurement. For instance, when we attempt to measure a distance,

and have taken all precautions we can, changes of temperature occur and alter the length of our measuring-tape; and, in spite of all that has been done by manufacturing tapes of alloys of different metals in order to counteract this effect, uncertainty must exist to some extent. Then as regards our angular measuring instruments, not only must there always be personal error and some imperfections in the graduation and centring, but the change of temperature again comes in, affecting the metal, and attempting to defeat our object of obtaining perfection. If we desire to measure the true vertical angle, there is always the troublesome and uncertain effect of the refraction of the atmosphere, which makes the mountain-top appear in a different place from where it really is, according to the heat, moisture in the air, and all sorts of other unknown causes which, in spite of all the corrections we may apply, occasion at least some uncertainty as to our result, whilst, in the case of the sun or star, it is considerably worse. So great is this refraction that when the sun appears to be just above the horizon, as you see it over the sea, it is actually not there at all, and has gone down below the horizon. Of course tables have been constructed to correct all this, but no one can say that they are really accurate, as the results depend so much upon local conditions, and they must after all be considered merely devices for making the best of a bad job. Then, again, when we have taken all possible care with the levelling of a theodolite, Nature, through inequalities of gravity, has an unsuspected trick of drawing the level out of its normal position, which introduces uncertainty, and is often most bewildering in its result. But enough has been said on this subject. The only safe rule for a surveyor to follow is never to assume that he is correct, and to take his observations so that the errors tend to compensate one another, whenever it is possible to do so.

So far what I have said has had chiefly to do with some of the earlier attempts at surveying and map-making, and the instruments and methods by which these have been carried out; and I will now try to give you an outline of what has been done in comparatively recent times, and state briefly the present position of various parts of the world as regards the condition of their mapping and the survey basis upon which their maps depend.

Little by little civilised man, by his daring, his love of adventure, and the necessities of events and circumstances, has penetrated into the unexplored parts of the earth and pushed back the clouds and mists that so long shrouded them from his knowledge, until at the present time the regions that are entirely unmapped are very few indeed, and do not amount to more than about one-seventh of the whole land surface of the globe, including the unexplored areas of the Polar regions, which may be either land or water. Not content with a mere vague acquaintance, he has striven for greater accuracy, and has turned to various branches of science and called them to his aid, in order that he may obtain more correct knowledge and a better comprehension of the earth's features. To enable him to fix with definiteness the position of places upon its surface, map out the various land-forms, and obtain their accurate

measurements, he has consulted the astronomer and mathematician. Commencing, as we have seen, with the rudest instruments and measuring apparatus, these, as greater accuracy was required, have gradually been improved, until the present-day appliances and equipment of a surveyor are wonders of refinement and delicacy.

In order that we may obtain a general idea of what parts of the world have been mapped and what have not, as well as ascertain something of the value of the survey basis for maps of the various parts of the world at the present time, I will now show a map I have recently drawn. It is merely an outline, and diagrammatic in character; but I trust will help to make the matter plain. By way of comparison I have drawn another map showing what was surveyed at all accurately, mapped from rough surveys and entirely unsurveyed and unmapped in 1860—that is, nearly sixty years ago. These maps (Plate I.) will, I hope, make the subject clearer to you than if I placed before you mere tables of figures and statistics, which, though important in their place, do not convey to the eye at a glance the facts and proportions that can be furnished by diagrammatic maps and diagrams.

For the sake of comparison of relative areas, the maps are all drawn on an equal area projection, that is to say, a square inch on the map everywhere represents the same number of square miles on the earth's surface. The idea kept in view in drawing the maps is that the shade deepens as the accuracy of the surveys increases. (1) The parts that are topographically mapped from triangulation or rigorous traverses are shown by the darkest tint: (2) those that are less accurately mapped from surveys chiefly non-topographical, and of which in many places the basis consists to a great extent of disconnected land office and property plans, are shown by the tint next in density: and then the next lightest tint (3) represents the parts of the world that are only mapped from route-surveys or rough traverses of explorers. Although these traverses vary greatly in degree of accuracy, they cannot be considered so reliable as the surveys shown by either of the other two shades, and in many cases the mapping consists of the roughest sketches. (4) The regions that are entirely unsurveyed and unmapped are indicated by the lightest tint of all, almost white.

Before dealing with the present-day map, I desire to call attention to the 1860 map. Referring to the state of surveys in the Eastern Hemisphere in 1860, it will be seen at once that outside the continent of Europe, where a considerable extent of accurate surveying had been carried out, the only country where any mapping, based upon triangulation, had been done was India. These areas are shown in the darkest shading. In Europe France, British Isles, Germany, Austria, Italy, Russia, Switzerland, Denmark, the Netherlands, and Scandinavia had already made a good commencement with their Government maps based upon trigonometrical surveys, but these were in several cases by no means complete, and it is interesting to note that even of Scotland there existed at that time no Ordnance Survey for the northern part. The southern part had been surveyed and mapped on the one inch scale long before this, but the survey was afterwards carried on in England, and,

1860

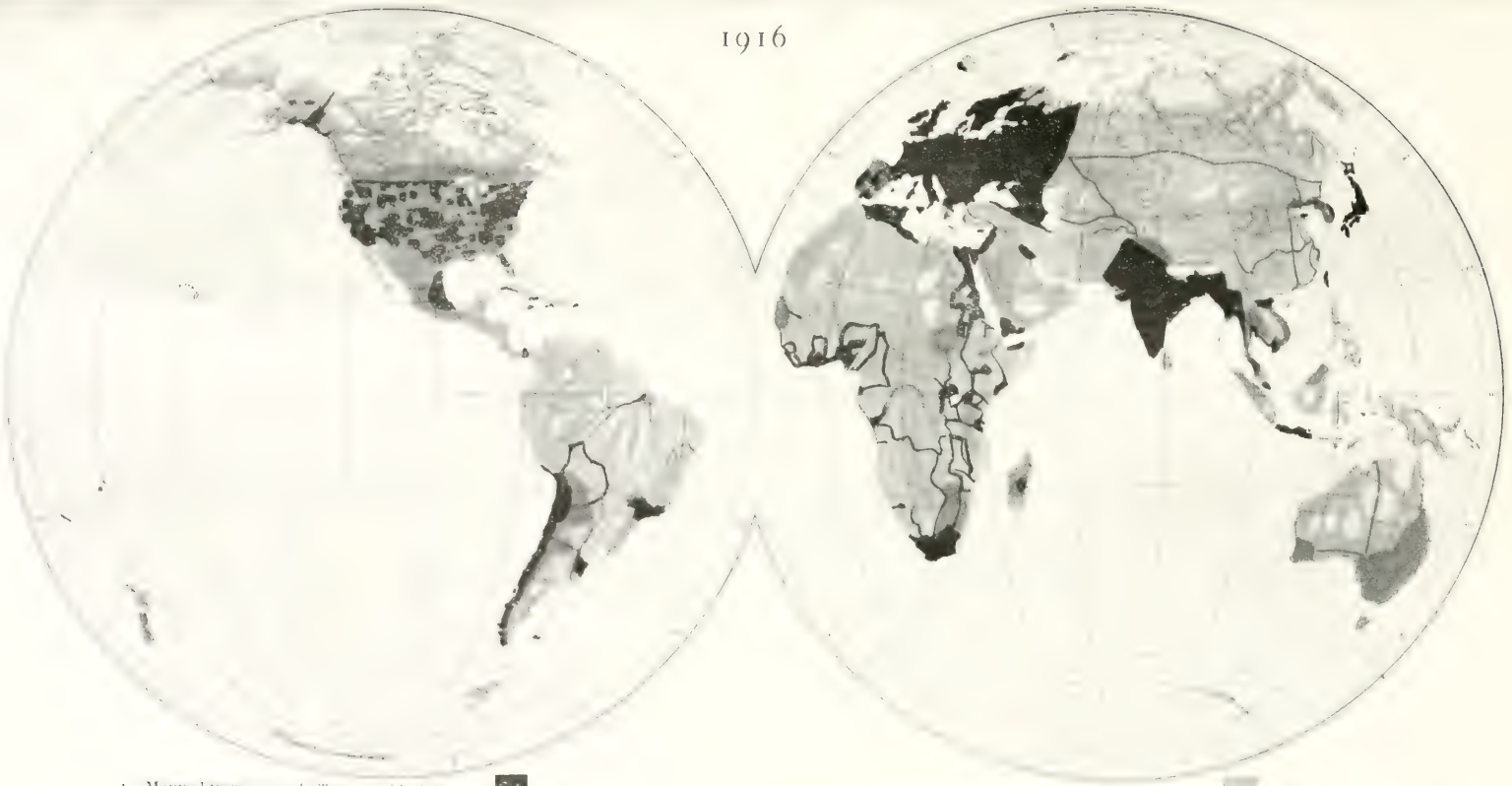
1 Mapped from accurate Topographical Surveys

2 Mapped from Less Reliable Surveys (chiefly Non-Topographical)

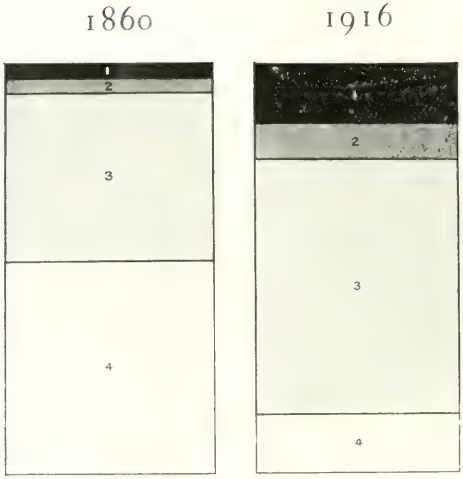
3 Mapped from Route Traverses and Sketches

4 Entirely Unmapped . . . . . .

1916



1. Mapped from accurate Topographical Surveys
2. Mapped from Less Reliable Surveys (chiefly Non-Topographical)
3. Mapped from Route Traverses and Sketches
4. Entirely Unmapped . . . . . .


1860
1916
1
2
3
4
2
3
4

later on, on the six-inch scale, in Ireland, so that the northern part of Scotland was not done in 1860. India has been noted for the excellency of its surveys ever since the days of Major Lambton, who started the work in 1804, and Colonel Everest, who succeeded him as head of the surveys after Lambton's death in 1823. As will be seen, in 1860 a considerable extent of India had been mapped from trigonometrical surveys. Even before Lambton's time India had been well ahead of any other country outside Europe with its surveys, which was entirely due to the energy and skill of Major James Rennell, who as Surveyor-General of Bengal surveyed the Ganges and lower Bramaputra rivers, as well as the districts of Bengal, with Behar, between 1763 and 1782.

In the parts of the Eastern Hemisphere that were surveyed and mapped in the second degree of accuracy according to our system, that is, those shown by the next tint, may be included most of the remaining parts of Europe, Egypt, and parts of Algeria near the coast. For the rest such mapping as was done was based upon rough route-sketches, shown by the third tint. In this must be included practically all that was known of the African continent, such as the regions explored by Mungo Park, Beke, Livingstone, Speke and Grant, and others, as well as the early exploratory surveys in Central Asia and Australia. The parts that were entirely unsurveyed and unmapped at this time were, as you see, enormous in their extent, and included not only the Polar regions, but vast areas of Central Africa, Asia and Australia.

Turning to the Western Hemisphere, we find that at this date no triangulation of any extent had been carried out. The U.S. Coast and Geodetic Survey had made a good start, but there work had been confined to the coastline or districts near the coast. There had been La Condamine's attempt at measuring an arc of the meridian near Quito in South America in 1736, the measurement of the Mason and Dixon line, and their survey of the boundary between Pennsylvania and Maryland, in the latter part of the same century; but neither of these resulted in any serious topographical mapping. Such surveys as existed of the interior parts of the United States in 1860, although they varied as regards their merits and degree of dependence, could not be considered as anything but approximate. Some parts of the eastern States are, as you see, shaded with a tint of the second density, but, with this exception, such mapping as had been done either in North or South America cannot be considered of a higher order than route-traversing and sketching, and is tinted accordingly.

Vast areas of Central Asia, and a still larger portion of the interior of Africa, were entirely unmapped in 1860, as was also the case with South America away from the courses of the great rivers, North America and the Arctic regions. Attempts had been made to penetrate and traverse the desert-like interior of Australia, but to a great extent this region was still entirely unmapped. Several important expeditions had commenced the exploration and mapping of the coastline of the Antarctic continent, such as that of Captain James Ross, who had penetrated a considerable distance south in the neighbourhood of South Victoria Land, Captain Wilkes and others, who had sighted land to the

west of this region. But, after all, little had been done in the way of surveying and mapping in the Antarctic regions.

Referring now to the 1916 map, on which the same shades of tints have the same meaning as on the previous map, you will see at once that the parts that are accurately surveyed from a topographical point of view, based upon triangulation or rigorous traverses, have greatly increased in extent, and these now represent, according to a rough estimate I have made, about one-seventh of the total area of the land surface of the earth, instead of only one-thirtieth, as was the case in 1860. Remarkable progress has also been made with regard to both of the less accurate kinds of surveying and mapping, while the parts that are now entirely unsurveyed and unmapped only amount to about one-seventh instead of a little over one-half, which was roughly the amount in 1860.

I have attempted to form an estimate of the condition of the world's surveys as represented by the differently tinted areas on the maps for 1860 and 1916; and taking the total area of the land surface of the earth together with the unknown parts of the Arctic and Antarctic regions, which may be either land or water, to be 60,000,000 square miles, I have obtained the following results:—

	1860 Sq. Stat. Miles	1860 Proportion to Whole	1916 Sq. Stat. Miles	1916 Proportion to Whole
1. Mapped from accurate topographical surveys based on triangulation or rigorous traverses.	1,957,755	= 0·0326 or roughly $\frac{1}{30}$	8,897,238	= 0·1482 or roughly $\frac{1}{7}$
2. Mapped from less reliable surveys chiefly non-topographical.	2,017,641	= 0·0336 or roughly $\frac{1}{30}$	5,178,008	= 0·0866 or just over $\frac{1}{12}$
3. Mapped from route traverses and sketches.	25,024,360	= 0·4170 or roughly $\frac{2}{5}$	37,550,552	= 0·6258 or little less than $\frac{2}{3}$
4. Entirely unsurveyed and unmapped.	30,997,054	= 0·5166 or just over $\frac{1}{2}$	8,350,794	= 0·1391 or little less than $\frac{1}{7}$

These proportions can perhaps be more clearly seen from the following diagram (Plate II.), on which the numbers and tintings have the same significance as on the maps and table.

From the figures here given it is plain that with the same rate of progress as that of the past sixty years or so it would take just over four hundred years more to complete the accurate trigonometrical surveying and topographical mapping of the earth's land surface, including the parts of the Polar regions that may possibly be land—that is, the 60,000,000 square miles which we have taken for this total area; but this will certainly not be the case, since the rate at which such surveys have been carried out has been greatly accelerated during recent years, owing to the rapidly increasing demands for accurate topographical maps, improvements in methods, and other causes, so that it will possibly not be half this time before all the parts of the earth's surface that are likely to be of any use to man as settlements, or capable of his develop-

ment, are properly surveyed and mapped. There are, of course, regions, such as those near the Poles and in the arid deserts, that are never likely to be accurately triangulated and mapped to any extent, and it would be mere waste of time and money to attempt anything of the kind.

As might be expected, the parts of the earth's land surface that are accurately surveyed, about one-seventh of the whole, are those inhabited by the most civilised nations and their dominions. The areas so mapped include the European countries (with the exception of some parts of the Balkan States), India, Japan, Algeria, Tunis, Egypt, and other parts of Africa under the dominion of European nations, United States, parts of Canada and Mexico, the international boundaries between some of the South American countries, and very restricted areas of Australasia. These have all regular government topographical surveys based on accurate triangulation, and are therefore shown in the darkest shade on the map. The parts that are still unsurveyed and unmapped in any sense are, as will be seen, certain remote unexplored regions near the Poles, a few small patches in Central Asia, much of the interior of Arabia, parts of the Sahara and certain other comparatively small areas in Central Africa, a considerable amount of the interior of South America, especially those parts between the great rivers, and certain areas of the interior of Australia. These are shown by the lightest shade on the map, and at the present day represent slightly less than the area that is accurately mapped. Between these two extremes the surveying and mapping varies in merit and degree of reliability from that of a fairly accurate nature, such as land-office plans (which as a rule make no pretence of showing topographical features) and the more accurate plane-tabling and compass-traversing, which altogether may be taken as covering about one-twelfth of the earth's land area, and that enormously extensive area only roughly mapped from route-traverses of explorers and others, which now constitutes about two-thirds of the whole of the earth's surface.

Many and varied have been the influences that have led to the surveying and mapping that have already been accomplished, and it would be interesting if we had time to analyse them. Among the preliminary surveys, I think it would be found that military operations would hold an important place. Many an unexplored region has been mapped for the first time as the result of frontier expeditions, such as those of the frontier regions of India and parts of Central and South Africa, whilst the need of a more exact acquaintance with the topographical features for military requirements have frequently led to more exact trigonometrical surveys. Our own Ordnance Survey is indeed an example of this, for in the first place it resulted from the military operations in Scotland in the eighteenth century.

Among other causes that have resulted in surveying and mapping might be mentioned the delimitation of boundaries, commercial or industrial undertakings, such as gold-mining and land-development, projects for new railways, all of which have at times been fruitful in good cartographical results. Nor must we forget Christian missions. The better-trained missionary has always recognised the importance of some

sort of a survey of the remote field of his operations, and the route to it, if for no other reason, with a view to the good of his fellow-workers and those who come after him: and, in the earlier days especially, a large amount of pioneer mapping was done by the self-sacrificing service of the missionary. We have only to think of such men as Moffat, Livingstone, Arnot, Grenfell, and others of the same sort, to be reminded of the debt due to the missionary from all interested in geographical mapping.

Still, few of the expeditions referred to so far have had surveying as their primary object, and such mapping as was carried out was incidental and necessary for the prosecuting of the main purpose in view. Properly equipped surveying expeditions that have been despatched from this and other countries have during recent times added enormously to our knowledge of the surface configuration of the earth.

The survey of British possessions in Africa and other parts of the world under the Colonial Office have recently made rapid progress, and full particulars of the work done are given from year to year in the Annual Report of the Colonial Survey Committee, which was first published in 1905. These reports, accompanied by plans and diagrams, contain most valuable information and show exactly what has been done, the method employed, cost of surveys, etc. All who are interested in these matters would be well repaid by a careful perusal of these valuable publications, which only cost a few shillings.

From its very foundation the Royal Geographical Society has had a remarkable influence on the surveying and mapping of the earth's surface, and especially those parts of it which have been previously but very imperfectly known or entirely unexplored. I think it must be admitted that this influence has increased as years have gone by, and it is no exaggeration to say that it has done more in this respect than any other body. It is therefore perhaps fitting that I should give some account of what has been accomplished, as it has a direct bearing on route surveying and mapping by travellers and explorers. It is not only by the awarding of annual medals to explorers whose journeys have resulted in an increase to our geographical knowledge, and the more accurate surveying and mapping of little-known parts, that the Society has stimulated and encouraged geographical research, but it has also assisted financially numerous expeditions, and the money thus granted has enabled many a man to carry out his explorations to a successful issue, which he otherwise could not have done for the want of funds. Still more frequently has it been the case that travellers going into little-known parts of the world have been granted loans of surveying instruments which they could not otherwise have taken, and encouraged to do what mapping they found possible. Altogether 331 expeditions have been lent instruments, and about £38,500 have been devoted to grants of money by the Society to further geographical exploration and surveying.

There is still another way, by no means the least important, in which the Royal Geographical Society has done much to promote geographical surveying, and that is by providing suitable instruction in the work of surveying for travellers. It is all very well to grant money and lend instruments, but the important thing is to know how to make good use

of the money and the instruments so as to take proper advantage of opportunities afforded and to produce the best surveys and maps of the regions visited. In the early days of the Society a man had to pick up the requisite knowledge where he could, but in 1879 a scheme of proper instruction was started at the suggestion of the late Sir Clements Markham, who was then one of the Honorary Secretaries. This had small beginnings, but in recent years has made rapid strides, until at present it forms one of the most important parts of the Society's work. This course of instruction in geographical surveying, which has now been in existence for about thirty eight years, was first conducted by my predecessor, the late Mr. John Coles, and, since he resigned in 1900, has been under my charge. Altogether seven hundred and twenty-five surveyors and explorers have received instruction, without reckoning special large classes of forty or fifty men which during the past few years, until the outbreak of war, have been sent to us by the Colonial Office to learn the more elementary parts of compass-traversing and mapping.

Now as regards the future. The demand for properly trained geographical surveyors has been steadily increasing in past years, and is likely to be still greater as time goes on. After the termination of the war there will be much work to be done, especially as regards the surveying of new boundaries, and freshly acquired districts in Africa and elsewhere: and it would be wise to make preparations for this well ahead.

The future surveyor will be in a much better position than his predecessors, not only on account of the improvements in instruments and apparatus for his work, but because, in many parts, a good beginning has been made with the triangulation to which the new surveys can be adjusted. In Asia much new work of this kind has been done over the frontier of India in recent years by the Survey of India and private expeditions, among the more important of which is the connecting of the Indian triangulation with that of Russia by way of the Pamirs. The many boundary surveys that have been carried out in Africa, the triangulations of Egypt, the Sudan, East and South Africa, and other parts of the continent are well advanced, and will be of the utmost value to the future surveyor. One of the most important lines is the great triangulation which, it is hoped, will some day run across the continent from south to north, from the Cape to Egypt. Owing to the energies of the late Sir David Gill, this important chain of triangles has already got as far as the southern end of Lake Tanganyika; the part to the west of Uganda near Ruwenzori has also been finished, and it now remains to carry the chain through German East Africa and down the Nile Valley. The latter, it is hoped, will by degrees be accomplished by the Sudan and Egyptian Survey Departments, although it may be delayed for some years yet: and the former, which was to have been undertaken by the Germans, it is to be hoped will after the War be accomplished by British surveyors, through—not German East Africa, but newly acquired British territory. Running right through parts of Africa that are but imperfectly mapped in many districts, the stations

of this triangulation will be invaluable for the adjustment of any network of triangulation for future surveys in the interior, and, indeed, have already been utilised for the purpose.

The carefully carried out boundary surveys between various countries of South America will be of the greatest assistance in future exploration and survey in the interior of that continent, wherever they are available, while the Survey Departments of Canada and the United States are doing excellent work and extending their surveys far into the imperfectly mapped regions of North America. So, altogether, the surveyor of the future will soon have a good foundation of reliable points to work from. It is important to remember that running a chain of triangles across a country, though important as a framework, does not constitute a map of the country; and what is wanted, at any rate in the first place, is a series of good topographical maps, based upon triangulation, showing the leading features with sufficient accuracy for the purposes of ordinary mapping, so that on scales of 1 : 250,000, or even 1 : 125,000, there is no appreciable error.

As regards instruments, the astrolabe à prisme is being increasingly used for taking equal altitude observations with most excellent results, but at the present time the five-inch transit micrometer theodolite, already referred to, is perhaps all that is required for general work. It has now been thoroughly tested and found most satisfactory. As regards smaller instruments there is the four-inch tangent-micrometer theodolite, and for rapid exploratory survey, where weight is a great consideration, a little three-inch theodolite has been found useful.

For baseline measurement the invar tape should be taken on all serious work, and for filling in the topographical features a good plane-table is doubtless the instrument to use. In mountainous regions and in some other special conditions photographic surveying doubtless has a future before it, and in military operations when the photographs are taken from aircraft it has proved itself invaluable: but in ordinary surveying it is, I think, not likely to take the place of well-established methods. The introduction of wireless telegraphy for the determination of longitude is likely to increase in usefulness. Good examples of the work done with it have lately been given in the *Geographical Journal* and elsewhere.

Time does not permit of my going more fully into this subject, and I must now bring this address to a close.

ITALY AND THE ADRIATIC.[1]

By Marion I. Newbigin, D.Sc. (Lond.).

In the April issue of the *Geographical Journal* (vol. xlvii. p. 241) Sir Arthur Evans published an article on "The Adriatic Slavs and the Overland Route to Constantinople," which is illustrated by a "Diagrammatic

[1] A paper read in Section E (Geography) at the Newcastle Meeting of the British Association, September 1916.

Map of Slav Territories east of the Adriatic," this map being a reduction of that prepared by Sir Arthur Evans for the Balkan Committee. The paper, which is one of great interest, may be described generally as setting forth the arguments for the establishment of a great Jugoslav state, and discussing in broad outlines the desirable frontiers of this future state. The publications of Dr. Seton-Watson, notably his last book—*German, Slav and Magyar* (1916)—deal in part with the same subject, and the issues of the *Southern Slav Bulletin*, distributed gratuitously by the Jugoslav Committee, no less than a number of pamphlets published by the same body, have also given wide publicity to Jugoslav aspirations. The *Southern Slav Bulletin* always contains a sketch-map entitled "The Jugoslav Territory," which shows by a dotted line through the middle of the Adriatic what is stated to be the "Natural Boundary between the Apennine and Balkan Peninsulas."

But while the point of view of the Southern Slavs has thus been repeatedly set forth, it is remarkable that, at least among English geographical journals, the Italian standpoint has received much less attention. Since both points of view will certainly have to be taken into account in the final settlement, it seems worth while to consider the latter in some detail, especially in its geographical bearings. It should be clearly understood, however, that the following paper is to be regarded as nothing more than an attempt to aid public opinion by setting forth an aspect of a political and geographical problem which seems to have received less attention here than it merits: the contained quotations must be taken as representing the opinions of their respective authors only, and not as in any sense official Italian statements, nor as necessarily indicating the views of the writer of this paper.

Sir Arthur Evans in his article gives a very instructive summary account of the geography of that part of the Adriatic borderland which he calls the Dinaric Triangle. It may be well to preface the present paper by a very brief summary of the essential geographical facts in regard to the whole Adriatic area, for Italy's interest in Balkan problems is due to the shape and relations of the Adriatic and the nature of its eastern and western shores.

The existence of the Sea is, of course, associated with the formation of the Alpine folds in the large sense. Speaking quite generally, we may say that the great curve of the Alps proper is at its western end continued to the south-east into the Apennines, while eastward the chain seems to divide. The northern branch swings round into the S-shaped curve of the Carpathians, continued into the Balkan Mountains. The southern branch, on the other hand, forms the Dinaric Alps and their continuations, which run generally parallel to the Apennines. Between the two lies the Adriatic Sea, its north-western continuation having been filled, as it were, by alluvium to form the great plains of North Italy. The alluvial plains are continually extending seawards, so that—geographically and economically a most important fact—their ports are continually tending to be choked by sand. Aquileia and Ravenna are dead: Venice is not well adapted for a modern port. Thus the essential feature in regard to the north-western borderland of

the Adriatic is that here there are lands of great natural productivity, lands also easily reached from the seaboard, and easily traversed in every direction, and yet on the actual coast there is as it were a hiatus, a difficulty in the loading and unloading of products owing to the absence of permanently deep water and the constant changes in the coast-line. In the case of Venice the actual hiatus between the railway terminus and the harbour is symbolic for the whole region.

These conditions prevail right round the head of the Gulf of Venice, beyond the present (*ante bellum*) Italian frontier, but from the Gulf of Trieste southward they are, as it were, reversed. Here the transport of commodities from land to sea or from sea to land is facilitated by the presence of deep water close in shore, by the absence of long, sluggish, waste-carrying rivers, by sheltered bays and gulfs giving many natural ports. But while all the material facilities for commerce exist here, the fact that numerous chains of parallel limestone mountains cut off the interior from the coastal belt means that the commodities which enter into commerce are either not available on the large scale, as happens over much of the Dalmatian coast, or have to be transported from the distant plains over that narrowed part of the mountain rim which connects the south-eastern Alps with the Dinaric chain. The two supremely important ports are of course Trieste and Fiume, both placed where the mountain rim is narrow, and access to the plain country beyond relatively easy. Further, as has been often emphasised, there is a very marked contrast in appearance, climate, and products between the narrow coastal strip, which is thoroughly "Italian" in character, and the "Central European" lands on the hither slopes of the limestone mountains.

The next point to notice is that as we follow both the western and eastern shores southward, their rôles seem again to be reversed. To the south of Ravenna the Apennines approach the Italian coastline, just as the Dinaric Alps do upon the opposite shore, the strip between mountains and sea becomes correspondingly narrow, and the difficulties of communication with the interior increase at the same time as the immediate hinterland diminishes in breadth and in productivity. The result is that the commercial centre of gravity in Italy is thrown here towards the western instead of the eastern shore. Ancona and Bari are very unimportant ports, and the significance of Brindisi is largely artificial, depending upon the rapidity of communication with the railway system of Central Europe, and not upon trade in the wide sense. Brindisi is not a natural gateway into Italy proper, and both it and Bari suffer from their position in a part of Italy which is agriculturally depressed.

So far as present trade goes, it may be said that the whole eastern coast of the Adriatic, from Fiume southwards, is even less important. The point, however, is, as I have stressed elsewhere, that the north-to-south section of the coast in Albania, the Albanian Gate, has generally the same character as the Venetian coast. Here are sluggish, silt-laden rivers; here is at least the possibility of access to a fertile interior; here is the probability that at the junction of mountain-fringed coast and low shore might be found a possible site for a miniature Trieste; here in

the lagoons are fish and chances of salt-making such as helped Venice to start on her career of glory. This region was once a line of entrance into the interior of the Balkan peninsula, and its present deadness is due, not to natural conditions, but to political jealousies and intrigues.

Still farther south the narrow Strait of Otranto is, of course, noteworthy. Its importance is perhaps sufficiently indicated when it is stated that Valona, on the eastern shore, has been described as being for Italy the Gibraltar of the Adriatic. M. Charles Vellay in his *La Question de l'Adriatique* devotes a whole chapter—one of great interest—to this port, pointing out that it has not only a supremely important geographical position, being the true key to the Adriatic, guarding its entrance or exit and also commanding the west-to-east route through the Mediterranean, but at the same time is admirably adapted to form a naval base of great strength. M. Vellay's very full account of the patient and skilful diplomacy which enabled Italy to establish herself here towards the end of October 1914, and shortly afterwards to obtain the consent of the Allied Powers to her occupation, and also to administer a check to Greece's ambitions in the Epirus region, is of special interest to us here in that it shows that Italy is perfectly well aware of the importance of the Adriatic to her future, and of the danger of permitting new rivals to acquire a settlement there. At the same time, according to M. Vellay, she is willing to consider Northern Albania as a zone of Serbian influence, and limits her claims to the territories placed to the south of Cape Semena (p. 97). This is a point of much interest in connection with a future settlement.

Let us turn next for a moment to the consideration of the characteristics of Italy as a whole. United Italy consists essentially of two parts, the peninsular and continental segments. Continental Italy, or Cisalpine Gaul, differs very notably in climate, in products, in topography, in relations, from its peninsular continuation. In its wide extent of level, fertile land capable of being ploughed, and of cereal production on the large scale, in the ease with which irrigation can be carried on, in the possibility of extensive livestock-rearing, in the facilities for intercommunication, in its relatively extreme climate, it differs notably from the southern region, where large tracts of level land are wanting, where both water supply and transport often present great difficulties, and where the climate and products are typically Mediterranean.

Broadly, the North Italian plains may be described as lands of the Central European type, with the notable exception that coal is lacking, and that—at least up till the present—the abundant water power has not been developed sufficiently to make up for the absence of fuel. But coal is also absent in some parts of Germany and over much of France, and this does not prevent Germany and France from being great industrial nations. Italy—and this is a point which is not so fully appreciated even among geographers as it should be—has both the desire and the intention of starting upon the same industrial path. From a variety of causes—of which one is the development of lands with the semi-tropical type of climate in other parts of the world, notably in

the United States—the typical Mediterranean products, such as wine, fruit, cereal production on the small scale, silk, and oil, no longer connote a prosperous peasantry, but rather a depressed and over taxed one, and the Italians are firmly resolved to seek prosperity and to check emigration by the means which have been successful farther north, that is by purchasing cheaply produced tropical or sub-tropical produce and manufacturing this in large-scale industry for the world market. Italian unity, by linking up two sets of lands of quite different characteristics, has rendered this possible, and the importance of the northern plains in the scheme has brought the question of commercial outlets and inlets for those plains insistently into Italian consciousness, is adding an economic to the sentimental interest in the control of the Adriatic and the ownership of the eastern shore.

One result of Italy's aspirations to become a great industrial state, and it is a result well worth note by the geographer, for he alone holds the key to it, is the strenuous Italian opposition to the sentimentality with which the country is still regarded. Japan was the country of the chrysanthemum, of geishas, and cherry blossom, till a disillusioned west suddenly awakened to the realisation of its commercial competition and its naval efficiency, and Italy intends to replace the present universal picture of her as a country of moonlight, ruins, and palaces by one not differing notably from our existing conception of Japan. We may note in passing that one factor which played its part in causing Italy's entrance into the war was this desire to prove that she also is a great power, that she is not only a country with a past but also one with a future. M. Jacques Bainville, in his recently published *La Guerre et l'Italie*, shows in a very interesting way the part which was played by the Italian "futurists" in producing the state of feeling which led ultimately to Italy's participation in the war, this being regarded as a means of hastening that conversion of the country into a great industrial state, which had previously lain as an unformulated desire in the national consciousness. He quotes from a speech delivered in Rome in May 1915 the following interesting phrases: "We are not, we will not be, a museum, a hotel, a summer resort, a horizon painted in Prussian blue for international honeymoons." These phrases are but an expression, in more sober language, of the ideas which led Signor Marinetti and his followers at a still earlier date to demand that the canals at Venice should be filled up, the gondolas disposed of, the ruins at Rome "dedicated to an earthquake," and to celebrate the growing triumph of the machine, and the superiority in beauty of factory chimneys over classical landscapes. The geographer at least, whatever his private sympathies, can scarcely deny that, as a rule, factory chimneys are associated with more solid comfort and better material conditions of existence than the classical landscapes of southern Italy, and can scarcely expect that a young nation should submit to grinding poverty and overtaxation in order that Italy, in d'Annunzio's words, should remain part of the stage scenery of a wedding journey.

Thus Italy believes that she has the possibility of great commercial expansion, and she has certainly the desire to develop to their fullest

the capacities of her northern plains, more especially as a means of counterbalancing the agricultural depression from which her southern lands suffer so severely. It is worth note in the same connection that she is at present—or was before the war—supplying a very large amount of relatively cheap labour to the industrial countries of Central Europe, notably Germany. This labour could be utilised within the country if industrial expansion took place on a considerable scale there. Those who, in the early days of August 1914, witnessed the pathetic scenes associated with the expulsion of the Italian labourers from Alsace, and their arrival in Basel on their way to Italy by the St. Gothard, will not need to have the fact of the normal utilisation of Italian labour in the industry of Central Europe impressed upon them.

One condition of industrial expansion in Italy is ease and freedom of access both to the markets and raw material of Central and Northern Europe, and also to the markets and sources of raw material in the Near and Far East. Further, we must not forget that one of the causes which has led Germany to seek expansion in the Near East, namely, the desire to establish some form of control over semi-tropical lands capable of producing raw material, notably cotton, by the aid of cheap labour, operates in the case of Italy also. Her problem, no less than that of the Central Empires, is to seek at the same time control of such lands and freedom of communication with them and with the Far East. As the centre of gravity of the new Italy is bound to lie in the north, and since westward the northern plains are ringed round by the passage of Alps into Apennines with scarcely a break, Italy's control of the Adriatic becomes for her a supremely important question. With the Adriatic problem, however, is bound up also the control of the eastern Mediterranean, both as a line of communication and because there is, naturally enough, considerable Italian emigration to those Near Eastern lands which have been partly depopulated by Turkish misrule, lands which are Italian in climate and products, and thus well fitted to become the home of Italian emigrants.

It is sometimes said, *e.g.* by Mr. Dominian in the *Geographical Review* (cf. this *Magazine*, p. 436), that Italian interest in the liquidation of the Turkish empire is small. But it must not be forgotten that, in the first place, Italy at present holds some of the Ægean Islands, and though her tenure of these has not yet been legalised by agreement among the Powers, she is not very likely to give them up, at least without substantial compensation elsewhere. Further, in the event, which many now contemplate, of a complete break-up of Turkey, there are likely to be lands in western Asia Minor whose fate will present a difficulty. All things considered, it is not probable that the vague suggestion that these might go to Greece will be acted upon, and certain Italian writers at least have suggested that Italy may put in claims in this direction. Thus Signor Rignano in his *The War and the Settlement: An Italian View*, seems to support the idea that Italy should claim Adalia and part of the western coast of Asia Minor, with a deep hinterland (p. 78). The immediate point is simply that both Italy's present occupation of some

Ægean islands, and her possible future claims in Asia Minor accentuate that interest in the control of the Adriatic which has its root in the geographical structure of United Italy.

Considering that geographical structure more in detail, we may note that, owing to the fashion in which the two segments of Italy—the continental and the peninsular—are joined to one another, and the relief of the land, the northern plains can find an outlet to the sea only at their eastern or western extremities. We have already emphasised the fact that the geographical advantage possessed by the eastern region, in that it slopes gently seaward, without any intervening mountains, is partially counterbalanced by the want of good ports at its margin and by the shifting coastline. Westward, however, the form of the Alps and their continuations means that the plains are cut off alike from the sea and from Central Europe by mountains, a fact which places Genoa at a great disadvantage. As is well known, that town is very largely a port for receiving merchandise, intended both for Italy and for Central Europe, and exports much less. This results in great congestion in the port and behind it, owing to the difficulty of finding sufficient rolling stock to carry off the superabundant imports in the absence of counterbalancing exports. Its position, far to the west, with a double mountain-backing, at some distance from the great plain of Lombardy, is also a geographical drawback, and this makes it all the more remarkable that it should be, after Naples, the second Italian port, the tonnage entering being, in 1913, in round numbers, 7,230,000, as against 9,268,000 for Naples. In the same year only about two-thirds the number of vessels entered Venice, these representing less than one-third of the tonnage (2,308,000). This is all the more peculiar in that Venice not only stands at the margin of the most productive part of the great plain, has at least the possibility of easy water communication by river and canal over that plain, and, finally, seems to be the natural terminus for the Brenner, the least difficult of the trans-Alpine routes, as well as being within easy reach of the St. Gothard and even the Simplon. One should note further that by means of the Arlberg the Brenner route connects both with Germany and with Zurich, and thus with the most commercially important part of Switzerland. Bearing in mind also its connections with Bavaria and Austria, one might suppose at first sight that the traffic between the Adriatic and Central Europe would pass naturally through Verona and Venice. In point of fact, a large part of this traffic is diverted into the South Austrian line through Tyrol, to debouch upon Trieste. The same line draws off also much traffic from the St. Gothard, and has an indirect effect upon the trade of Genoa. This deflection of traffic is in part due to the natural superiority of Trieste as a port, and is in part deliberately engineered by Austria by means of tariffs and so forth. But whatever the causes, the fact is very important, for it adds a powerful economic argument to the sentimental Italian longing to "redeem" Trieste. In this connection we may note that in 1913, 11,231 vessels, representing a tonnage of 5,480,074 tons, entered Trieste, and of these over 90 per cent. were Austrian, so that as a port it is more important than Venice, and not very greatly inferior to Genoa, the relative importance of

the three being represented in round numbers by the following figures, Genoa 7¼ million tons, Trieste 5½ millions, Venice 2¼ millions. It may be suggested, therefore, that the Italian population of Trieste, whose existence has given rise to the cry for "redemption," is directly due to economic causes: the population has followed the same direction as trade. At present, as Signor Paolo Revelli[1] bluntly remarks, Austria has practically monopolised the commerce of the Adriatic: the advantage of the Suez Canal is almost exclusively for Central Europe, and Italy has but little share in it. While this condition exists, Italy's dream of becoming a great industrial power is jeopardised.

Hitherto Austria has concentrated her commercial power in the Adriatic in the north-eastern corner, and, largely no doubt in order to prevent an increased Italian interest in Balkan affairs, has artificially prevented, so far as possible, the development of the eastern coastal strip to the south of Fiume. But no one now doubts that both the Central Powers contemplated utilising the natural advantages of the eastern Adriatic, from Pola to the Bocche di Cattaro, to acquire maritime supremacy both in the Adriatic and in the eastern Mediterranean generally, and from the Italian point of view it must not be forgotten that Italy has hitherto been without a naval base from Venice to Brindisi, and that thus from the east she is singularly unprotected. The assumption, which seems to be tacit in some Jugoslav programmes, that she will fight to deprive Austria of this great advantage, and yet be willing to put another power in possession of that Dalmatian coast, with all its possibilities for attack, seems to me a highly questionable one. Nor can I feel certain that she will accept as adequate protection against a possible future danger the statement in *The Southern Slav Programme* that "As our nation has no desire for expansion, it cannot constitute a menace for Italy in the Adriatic. We are not even contemplating the construction of a navy" (p. 28). More especially when the statement is accompanied by the assertion that "Our people are the true representatives of commercial and maritime enterprise all along the northern and eastern Adriatic coast" (p. 29), and that the "entire freedom of our seas" is necessary to the new nation.

Another point, though a somewhat minor one, is the value of that rather barren coastline in what has been called the tourist industry. Austria's ultimate designs have made it impossible for her to permit the natural economic development of her Balkan lands to take place, but while waiting for the chance of carrying out her ultimate purpose she has been careful to do all in her power to attract tourists to a beautiful land, and in this has achieved a considerable measure of success. It is an item in the Jugoslav programme that the Dalmatian coastline should be theirs in order that they may obtain the benefit of this tourist traffic, which would be very helpful to a young state.[2]

Put in its most extreme form, one thus sees that from the Italian

[1] *Rivista Geografica Italiana*, February-March 1916.

[2] "We desire to keep our beautiful Riviera from Trst (Trieste) to Kotor (Cattaro), and ourselves to profit by the rich revenues that accrue from its possession."—*Southern Slav Programme*, p. 29.

point of view the Jugoslav programme presents three dangers. In the first place, especially if the Italian claim to Trieste is not admitted, it would menace Italy's designs of future economic expansion. In the second it would almost certainly, in the future if not at once, lead to the establishment of a strong maritime power on the Dalmatian shore. And thirdly, it would give to a new state, and not to Italy, a very considerable source of immediate income in tourist traffic. In connection with this last item we have to remember that Italy, which has been doing the fighting, will, like the other existing powers, have a very large debt to pay off.

Of these three points only the second seems to need further discussion here. It is generally admitted that any power which holds the Dalmatian coastline is almost bound sooner or later to become a powerful maritime force. Sir Arthur Evans in his paper in speaking of Dalmatia (p. 248) points out that these "coast lands have provided their civilised occupants —Roman, Venetian and 'Austrian'—with a race of born sailors said to be unrivalled in any Mediterranean region," and the peculiar fact that only here does one find Slavs with the genuine seafarers' instinct has often been commented upon. The geographical influence of environment seems here to be so strong that any race, whatever its past, can learn sea ways in those sheltered inlets and channels. In his paper Sir Arthur Evans emphasises repeatedly the dangers to which Italy would be exposed in the event of the Central Powers succeeding in establishing themselves firmly as aggressive naval forces on the eastern Adriatic. He does not, as it seems to me, supply a sufficient reason, from the Italian point of view, for the establishment of a Jugoslav state which might in the distant future similarly become an aggressive naval power.

Italy, through the mouth of Signor Salandra, stated that her impelling force in national action is a "sacred egotism," and it seems to be courting disappointment to assume that having gone to war to serve her own ends she will be willing to create for herself new difficulties in a perhaps distant future. Charles II. believed himself safe against revolution on the ground that his people would never dethrone him to put his brother in his place, and Italy might well ask why she should displace Austria in order to create an active new state, free from the Austrian elements of disunion, and establish this in a region from which her own shores could be easily threatened.

Sir Arthur Evans in his vivid discussion of the structure of the north-eastern Balkan region lays great stress upon the difficulty of the mountain ranges which overhang the Adriatic in the Dinaric Triangle, and on the intimate geographical connection between the valleys of the Drave and Save and the mountainous interior of Bosnia and Herzegovina. At the same time, in spite of his stress upon the detachment of the sea-coast from the interior owing to the intervening mountain barrier, he states that the sea front cannot be held permanently by any power which does not hold the mountains, and that these mountains cannot be held from the sea. It is doubtful whether it would be impossible to devise some frontier along the mountains which would safeguard Italy's interests in a far more comprehensive fashion than the Jugoslavs seem to contem-

plate, but the immediate point is merely to show how strong Italy's feelings are in the matter. A few quotations from M. Bainville's book, written with the definite purpose of making Italy's attitude towards the war clear in France, and from Signor Revelli's article already mentioned, may make the point clearer.

M. Bainville (*op. cit.*, p. 280) says that Italy's objects in entering the war were definitely four in number: (1) to take from Austria the unredeemed lands of Trieste and the Trentino: (2) to dominate the Adriatic, and preserve equilibrium in the Balkans; (3) to consolidate the results obtained in the Ægean by the occupation of the Dodecanesian islands, as a preface to the development of Italian penetration in the East, especially in Asia Minor: (4) to affirm her position as a great European power, freed from all subordination, from all servitude of whatever kind. He adds: "A fact which must not be lost sight of is that the war which Italy has undertaken is above all a war of expansion and of conquest," and goes on to point out how in this respect the Italian standpoint differs notably from that of France and Britain. Signor Paolo Revelli, in the article in the *Rivista Geografica Italiana* on the Adriatic and the control of the eastern Mediterranean, already quoted, concludes as follows: "In times when we have a logical right to expect from the conscience of the civilised powers at the future Peace Congress, with the condemnation of all brutal attempts at imperialistic expansion, an admission of the legitimacy and value of well-founded national aspirations, no dispassionate and impartial judgment could deny the Italian right to predominance on that sea which for nearly four centuries bore on maps the name of the Gulf of Venice, from the map of Andrea Bianco in 1436 to that which Captain Francesco Zavoreo constructed in 1806 for General Marmont.

"The legitimacy of Italian aspirations in the Adriatic can be denied only by those who do not admit that Italy has a right to full and entire independence, or who fear that predominance in the Adriatic might give to Italy predominance in that section of the Mediterranean which for some years seems to have been regaining its ancient importance in commerce and in international competition. And the legitimacy of an effective control of Italian interests in the eastern Mediterranean can be denied only by those who do not know or who forget that on the shores of the Sea of Syria there exist stable nuclei of Italian population, and that, at the beginning of the Italo-Turkish war, there lived in the lands which border the eastern Mediterranean and the Black Sea more than 90,000 Italians; can be contested only by those who judge inadequately the force of expansion and the ascendency of the Italian element."

These quotations may serve to show that many Italians at least have very clear and definite notions on the subject of the Adriatic, and its significance for the Italian state. M. Bainville is even more explicit both on the more general points and on the subject of the famous formula of the "principle of nationalities" which threatens to become an obsession with many writers. It may be sufficient, however, to say briefly that the Jugoslav programme, as formulated in this country, is unlikely to find many supporters in Italy, and that we in this country would be

unwise to press the "principle of nationality" too warmly upon another state. Valona is not the only "Gibraltar" in the world.

Sir Arthur Evans, after stating that the Italian party in Dalmatia is now practically extinct, goes on to say (p. 247) that "to day Dalmatia is the centre of the South Slav nationalist movement that aims at the eventual union of all its component provinces with Serbia and the formation of a Jugo Slav or South Slavonic State." But Revelli, on the other hand (p. 111), after speaking of the majestic vestiges of Roman and Venetian domination on the shores of the eastern Adriatic, adds: "Rome and Venice did not only found there ephemeral colonies submerged by the flood of barbarism in early mediæval times, and later by the Turkish wave, or destroyed to their last traces by the cunning greed of the Hapsburgs. They have imprinted with their stamp, with their mode of life, the population of that other shore, on which they, and they alone, have exercised an enduring civilising influence. To deny the importance of this is to deny what is admitted by the most cultivated Slavs of the other shore. And to sacrifice entirely an element of such tenacious vitality to the brute value of numbers, to the purely numerical predominance of the Slav nationalities over the Italian nationality in the interior of Istria, and in the coastal belt of Dalmatia, is to attribute to transitory statistical data not only a supreme value, but a value such as to annul all others."

These phrases are, perhaps, but a reflection of a famous discourse delivered by d'Annunzio in the spring of 1915 to a deputation of exiled Dalmatians, who presented to him a book written to glorify their country. As quoted by Bainville (p. 305), d'Annunzio said: "This book which you have placed in my hands, is an act of possession. It is short, and yet of great importance. To us it indicates, clearly and concisely, in the style of Rome, that Dalmatia belongs to Italy both by human and by divine right. Whether under the Latin force of Rome, of the popes, of Venice, or under the barbaric force of the Goths, the Lombards, the Franks, the Germanic Ottos, the Byzantines, the Hungarians, the Austrians, the civilised life of that other shore, like the civilised life of this one, was always in origin and in essence Italian. It has been Italian, it is Italian, it will be Italian. Not the German from across the Alps, not the Slovene from the Carso, not the Magyar from the Puzta, not the Croat who ignores or falsifies history, not the Turk disguised as Albanian, no one can ever check the achievement of the inevitable rhythm, the Roman rhythm."

These may be but the words of a poet, but they are those of a poet who stirred his countrymen to action by finding words for their previously unformulated desires, and it seems well for the future peace of the world that they should receive as wide a publicity as the other statement that the Italian party in Dalmatia is practically extinct.

Perhaps it may be well to add a few words from another Italian writer, who has apparently much sympathy with the Jugoslavs. In *Italy and the Jugoslav Peoples*, "Civis Italicus" says (pp. 29-30): "Although it may be impossible to divide the territory in dispute between Italy and Jugoslavia in such a way that all the Italians may

be assigned to the one and all the Slavs to the other part, it will be possible to arrive at a partition which will be approximately rational and equitable. To Italy appertain by right those territories which by tradition and culture are conspicuously Italian even if they contain a slight Slav majority, since mere numbers ought not to form the only criterion. So also we ought to have those tracts of coast and those islands which are indispensable for our security. The rest will belong to the Slavs."

As the object of this article is not to offer a solution of a very difficult and highly controversial problem, but merely to state, as impartially as may be, the Italian position, and indicate its geographical aspects, it is not necessary to comment upon these sentences. It is obvious, however, both that much depends upon their detailed interpretation, and that, under any interpretation, they are incompatible with Jugoslav aspirations in their more extreme form.

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THE SO-CALLED MYTHICAL ISLANDS OF THE ATLANTIC IN MEDIÆVAL MAPS.[1]

By William H. Babcock.

General Survey.

We find, then, that many of the elusive and impermanent map-islands with which we deal have had a comparatively recent origin and brief existence, a few being memorials of the religious enthusiasm of

[1] Continued from p. 128.

men who crossed, after Columbus, the warmer parts of the North Atlantic, while others commemorated persons or events now forgotten, and still others embodied errors of observation in the navigator's sense, duplicating islands or transplanting bits of mainland tracts out to sea far from their true stations. Mist, mirage, cloud-forms, drifting ice, and misunderstood aspects of the surface of the sea may have lent their delusive aid in the creation of such as are not clearly traceable—like Greenland's progeny—to solid land imagined out of its place. Of the whole crew none is more important than Buss, which so plainly shows us a mythical island in the making.

On or near the border between these and the earlier and more lasting series, we have Isla (or Illa) Verde, Green Island, apparently in some instances derived from Greenland, as stated, yet again occurring as a quite independent record of tropical luxuriance near the upper shore of South America, and also shown as an American or oceanic island of temperate latitudes, in which some Greenland inheritance and a special acknowledgment of mere greenness may coincide. It is certain that the name stands for at least two islands or insular conceptions, perhaps for three; but all of them, so far as we know, began after the discoveries of Columbus, Cabot, Vespucius and Cortereal; so Green Island, however understood, can tell us nothing of the pre-Columbian period.

The Zeno islands Drogeo and Estotiland are put forward by the narrative as visited before the time of Columbus, and may easily be identified with certain tracts of America, but we cannot trust this authority. At the most, it leaves a hazy impression that some one perhaps reached them and returned without being able to tell a true tale of his wanderings, or at least to get it preserved in trustworthy form. The oceanic islands which the Zeno brothers profess to have visited in person—Estland, Frisland, Icaria, and the rest—are European islands modified and shifted in location.

Daculi is undoubtedly and perhaps wholly pre-Columbian, being one of the most ancient of legendary islands and of long continuance. It has nothing to do with America; it may be St. Kilda out of place, endowed with an atmosphere of myth and magic for which the isolation and saintly associations of the island in early mediæval times would offer opportunity.

St. Brandan's Island shares with Daculi an especially mythical character and European or near European origin. So far as the maps show, its first appearance, in the plural, was as Madeira with its satellites—"The Fortunate Islands of St. Brandan"—dating from 1339. This remained unchanged, with the possible inclusion of some of the Azores, for a little more than a century, when Bianco set it among his supplemental series beyond the Azores as a single island in form and name. Afterward Behaim moved it far south-west to the American route from Cape Verde, and Sebastian Cabot and Descelliers carried it into the north temperate zone well over toward the regions below Newfoundland; but there is no justification for the suggestion that it ever implied any American discovery.

It is probable that the name Antillia, in the fifteenth century, was applied to Cuba, and that the delineation of this and three other islands in the map of Beccaria and others constitutes a record of a report of a partial exploration of the West Indies and Florida made at some time between 1400 and 1435, perhaps not far from 1414. The map figure of the second largest island of the group, Salvagio, or the Hand of Satan, may be the earliest surviving announcement of a visit to mainland America by any one from southern Europe. Much farther south another and later crossing may be indicated by Bianco's "authentic" south-western coast opposite Cape Verde on his map of 1448, but this is uncorroborated unless by uncertain historical statements and ambiguous figures and entries of other maps: also it affords no internal evidence except the great extent of coast and a debated statement of distance. The names Antillia and The Island of the Seven Cities appear to have been first applied in the Azores, afterward moved westward, and applied to the same American island, but separated at last, Antillia remaining, with slight change, to denote the archipelago, whereas the other name went to an imaginary island and to Indian pueblos before disappearing altogether.

Brazil (also called Montonis, Montanis, Montorius, and Binar) was probably the region surrounding the Gulf of St. Lawrence, which projects far eastward from the body of North America in the latitude of Ireland. The name is apparently Irish, and identical with Breasail. Its first appearance on the maps is in 1325; in English records 1480; in Italian commerce ("grain of Brazil") in 1193; though as Breasail in Ireland it has a prehistoric antiquity, a comparatively late instance being that of the sixth century Irish saint, originally of that name, who is said to be buried in the Aran islands. It seems most likely that some one from Ireland, or at least some one speaking the Irish Gaelic language, had reached this part of America before the Norse visits at the beginning of the eleventh century, in view of the early Norse references to Great Ireland, and other indications.

The approximately crescent-form island of Mam, also called Brazir, Jonzele, Bentusle, Man, Mayda, Maydas, As Maydas, Asmaidas, Asmandas, Vlaanderen, and perhaps Bolunda, appears always as a consort of Brazil, and usually south west or west of south therefrom, at a considerable interval. Its names are plainly derived from several languages, the oldest names being Celtic. It was probably believed to have been visited at various times by ships of several nations. The Pizigani map of 1367 includes a pictorial announcement of a disastrous expedition thereto by ships of Brittany at some earlier time unknown. The inscriptions on this map may also indicate some experiences of Arabs in that quarter. Its persistent association with Brazil and location relative thereto, as well as the name, Man, shared with the island in the Irish Sea, may point to an Irish discovery by way of the former island. It seems ancient, and its appearance on the maps as we have them is little more than forty years after that of Brazil. Its case for identification as a part of North America hangs largely on that of the latter. It may be Bermuda or Cape Cod, or neither.

We have therefore a highly convincing demonstration of West Indian discovery a little before the birth of Columbus: proof of the now generally admitted visits of the Icelandic Norsemen to Labrador, Newfoundland, and American points further south, about four hundred years earlier still; distinct indications of Celtic visits to the same American regions of the temperate zone at indeterminate periods, but perhaps preceding the Norse in at least one instance of a crossing from Ireland, and fixed as some time before 1367 in the case of a crossing from Brittany; beside hazy hints in names, inscriptions, and outlines of other such voyages. In the aggregate these evidences undoubtedly tend to expand our idea of the period of the unveiling of the New World, and the number and variety of navigators who must have taken part therein to some purpose before the establishment of continuous communication between the continents about the end of the fifteenth century. There is good reason to hope that additional maps and writings, as yet buried in library corners and other repositories, may be found which will fill in some of the gaps, add corroboration, and make many details clearer.

I.—*List of Maps referred to in Text.*

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Beatus map, derivatives of,	8th Century
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Frankfort-on-the-Main map,	16th Century
Freducci, C.,	1497
French map (1669, latest discovery date),	*c.* 1700
French map, Anon.,	1771
Gastoldi, illustrating Ramusio,	*c.* 1550
Germanus, Henricus Martellus,	1489
Giraldi,	1426

Hakluyt (illustrating Peter Martyr),	1587
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La Cosa, Juan de,	1500
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Tassin,	1634
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OBITUARY.

Dr. Harvie Brown.—By the death of Dr. J. A. Harvie-Brown on July 26 last the Society lost a firm supporter and former member of Council, and Scotland an enthusiastic naturalist. Dr. Brown's chief interests lay in the direction of natural history, especially ornithology, but he had travelled widely, especially in Northern Europe, and had a singularly wide acquaintance with Scotland. In conjunction with Dr. Bartholomew he compiled a Naturalist's Map of Scotland, on which "Faunal Divisions" were shown, while he was editor and chief contributor to the series of volumes called the "Vertebrate Fauna of Scotland." For many years also he was one of the editors of the *Annals of Scottish Natural History*, and continued to be associated with this journal after it became *The Scottish Naturalist*. Of recent years Dr. Harvie-Brown's

health considerably restricted his activities, but he kept up his intellectual interests to the end. His sympathy with the work of the Society was shown by the care with which he read the *Magazine*, and so lately as the early months of the present year he sent to the editor a cordial appreciation of certain articles which had appeared in it.

Mr. Charles Dawson.—On August 10 the death was announced, at Lewes, of Mr. Charles Dawson, the discoverer of the famous Piltdown skull, found in 1912. Mr. Dawson, who was a solicitor by profession, was from an early age greatly interested in palæontology, and for many years devoted himself to the fossil reptiles of the Weald round Hastings. Of these he made a large collection, which is now placed in the British Museum. He was also the discoverer of the first-found tooth of a Wealden mammal. His interest in archæology was no less keen than in geology, and led him to make continuous search in the Sussex gravels for remains of early man and his handiwork. The discovery which will always remain associated with his name was thus not a matter of accident, but the fruit of long years of labour. His death at a comparatively early age is a great loss to science.

Colonel Gibbons.—The death in action is announced of the noted African explorer, Lieut.-Colonel A. St. Hill Gibbons, who was especially associated with the mapping and exploration of Barotseland. Much of his work was done in the nineties, especially in his two expeditions of 1895-6 and 1898-1900, when he traced the Zambezi to its ultimate source, and provided valuable information about the navigability of the river, the resources of the country, and the customs of its people. His routes in this region covered about eight thousand miles and his maps are remarkably accurate. During his second expedition Colonel Gibbons, after completing his work in Barotseland, followed the Congo Zambezi watershed towards Lake Tanganyika, and, striking northward, made his way to the Nile valley. In 1906 he received the Gill Memorial of the Royal Geographical Society. After serving in the South African War Colonel Gibbons settled in Northern Rhodesia, a territory in whose development he took an active interest. He lectured to the Society on his African explorations in 1901, and on British East Africa in 1906. In 1905 he received the Society's Silver Medal in recognition of his African work.

GEOGRAPHICAL NOTES.

Asia.

Early Migrations in the Near East.—In the *Journal* of the Royal Anthropological Institute for January-June 1916, Mr. Harold Peake, while discussing the particular problem of the etymology of the people who destroyed the Trojan city Hissarlik II., puts forward a general theory of racial migration in the Near East which, though speculative, is of much interest. He accepts Mr. Ellsworth Huntington's view of the occurrence of a great period of drought, beginning about 2450 B.C., and

believes that this led to extensive race movements of Arabian tribes across the peninsula of Sinai into the Egyptian delta, while later successive waves invaded Palestine and Syria, introducing the knowledge of metals there—this having perhaps been obtained from their kinsmen in Egypt—and founding Damascus. From Syria the tribes found their way into Assyria and Babylonia. Meanwhile the drought in the steppes adjoining the Caspian led to the migration of the Bak tribes into China, and, at a later stage, the Nordic steppe-folk on either side of the Volga occupied the area abandoned by the Bak tribes. Thence they passed into Persia, where they became known as the Kassites, while other members of the same group migrated westward, overran Galicia and Roumania and penetrated into Hungary and Thrace. The Thracian group divided into two bands, of which one passed into the plain of Larissa while the other crossed the Hellespont, destroyed Hissarlik II., and poured into Anatolia. These may have later appeared in the south as the Amorites, or they may survive to the present day as Kurds.

Africa.

Welwitschia in South-West Africa.—Mr. W. R. Ogilvie-Grant sends to the *Times* a letter on the preservation of this interesting plant, well known to botanists on account of its extraordinary appearance, and to geographers because of its limited distribution, its rarity, and its perfect adaptation to life in the desert belt of South-West Africa. It was first discovered in 1865 by Dr. F. Welwitsch, whose name it bears, to the south-east of Mossamedes, in the desert region of Southern Angola, but the best-known locality is in the neighbourhood of the station Welwitsch, on the Windhuk line. Here it was carefully protected by the Government of German South-West Africa, who made a miniature "park" for its preservation. Mr. Ogilvie-Grant writes to call attention to the fact that the Administration set up by the Union of South Africa is continuing to protect the plant, the fenced-in area being retained, and no one being allowed to dig up or sell specimens. The plant, which has only two leaves throughout its existence, and grows for a century or more, seems to have no near relations living at the present time, and it is gratifying to learn that the new administration appreciates its scientific interest. It will be found figured in most of the books dealing with the distribution of plants, *e.g.* in Schimper's *Plant Geography*. The fact that in the wild state seedlings are apparently very rare, and the possible bearing of this upon climatic changes in South-West Africa was discussed here in a note in vol. xxiii. p. 316.

America.

The Katmai District, Alaska.—Dr. R. F. Griggs of Ohio State University has been exploring in this region during the present summer, his special object being the study of the re-peopling with plants of the vast region devastated by the great eruption of Mount Katmai in 1912. He reports that the crater of this volcano is one of the largest in the

world. It appears to be both enormously wide and deep, and is floored by a blue-green lake. The most wonderful sight in the crater area was the presence in its wall of a glacier, which was blown in two by the 1912 eruption but not melted, so that it forms a palisade at the crater margin.

AUSTRALASIA.

Climate and Agriculture of Australia.—In *Bulletin* 11 of the Commonwealth Bureau of Meteorology Mr. Griffith Taylor discusses the agricultural possibilities of Australia in so far as these are determined by the climatic factor. He confines himself to the distribution of cattle, sheep, and wheat, and finds that in regard to the last-named rainfall is the chief control, while it is scarcely less important in connection with sheep and cattle. As regards temperature, cattle show a wide adaptability, but the successful growing of wheat can only take place within certain well-defined limits, and in the case of sheep also the range is of considerable importance. Questions of topography, soil, or accessibility are not discussed in the memoir, though these naturally have an important bearing on the general question. Mr. Taylor believes that so far as temperature and rainfall go, south-eastern Queensland, a region which at present grows but little wheat, is well suited for wheat production. He suggests that in this district the Indian practice of planting the wheat towards the end of the summer rains should be followed, which would mean early in March. The wheat would ripen in about four months, during which it would receive an additional five inches of rainfall.

Irrigation and the Cultivation of Taro in Polynesia.—At a meeting of the Manchester Literary and Philosophical Society held on May 30 last, Dr. W. H. R. Rivers read a paper on the relation between the cultivation of taro and megalithic culture. Where the plant is grown in Oceania there is an intimate connection between it and the practice of irrigation. Now Mr. W. J. Perry has shown that irrigation belongs to the megalithic culture, and if this be so taro must have had a similar history. The distribution of the plant is found to support the suggestion, provided its tropical and semi-tropical habit is taken into account. It occurs in Oceania, the Malay Archipelago, India and Eastern Asia, Arabia, Egypt, East and West Africa, the Canary Islands, Algeria, Southern Italy, Spain, and Portugal, as well as in tropical America. Since its original habitat is Southern Asia, its use as a food was probably acquired by the megalithic people in India, and taken by them both to the east and west. A difficulty, however, arises from the fact that irrigation is not practised in the island of Malekula, in the New Hebrides, where megalithic influence is present in a very definite form. To explain this it is pointed out that means of disposal of the dead suggest that there were two megalithic intrusions into Oceania, and the high degree of development of irrigation in such outlying islands and districts as New Caledonia, Anaiteum, and north-western Santo in Melanesia, and the Marquesa and Paumotu Islands in Polynesia, suggests that the prac-

tice belonged to the earlier of the two movements. There is reason to believe that this movement had relatively little influence in Malekula.

POLAR.

The Shackleton Expedition: Rescue of the Elephant Island Party.—After our last issue had gone to press, it was announced that Sir Ernest Shackleton, not waiting for the arrival of the *Discovery* (p. 441), had left Punta Arenas on August 26 on board the small Chilean schooner *Yelcho*, on a fourth attempt to rescue the Elephant Island party. On September 3 Sir Ernest telegraphed from Punta Arenas the welcome news of his return there after taking off the whole party on August 30, all being well; his perseverance in the work of rescue has thus been amply rewarded. As the party landed on April 15, their enforced sojourn amid the ice of Elephant Island lasted four and a half months. Mr. Frank Wild gives the following account of their experiences, which we quote from the *Daily Chronicle*:—

"On April 25, the day after the departure of the boat, the island was beset by dense pack-ice. The party was confined to a narrow spit of land, 250 yards long and 40 yards wide, surrounded by inaccessible cliffs and ice-laden seas. We were forced to abandon our ice-hole, which was made untenable by the snow. We made a dwelling of our two boats, supported by rocks, and set up as far as practicable from the sea. The weather continued appalling. It was difficult to work, and the vitality of the whole party was lowered owing to exposure. Blackboro, Hudson, Greenstreet, and Rickinson became ill, and several others were frost-bitten. In May a heavy blizzard swept much valuable gear into the sea, and we were in grave anxiety owing to the danger of being swept away by the heavy seas raised by a blizzard which was blowing at a velocity of 70 miles an hour. Fortunately, owing to the low temperature, an ice-foot formed on the sea-shore, and this protection was the means of saving us from total destruction. On several occasions the adjacent glacier 'calved,' throwing up heavy waves, and on one occasion blocks of ice were hurled to within 15 feet of our dwelling. Observing how the island was beset, I realised the difficulty our leader must experience in effecting our early relief, and as a measure of precaution I drastically economised our food, allowing only one hot meal daily until we had strengthened our reserve of blubber. Our valuable stock of bovril rations was used for two meals weekly, thus supplying a vital change in our diet, and life was well maintained. Nature's providence having arrived at the island late in the season, we were kept in anxiety as to our meat supply, which was constantly depleted. It was periodically replenished by small penguins, but the seals were unable to land owing to the ice-foot. From June onwards the weather was better as regards wind, but we were under a constant pall of fog and snow. In the middle of the winter Blackboro's toes had to be amputated. Whenever the sea opened our hopes of relief were renewed: the three previous attempts at relief had synchronised with the times when the island was beset with ice. At the beginning of August we were able to collect

seaweed and limpets, which formed a valuable change in our diet, but the deep water, heavy seas, and ice prevented us from fishing. On August 28 the gale drove the pack from the island, and on August 30, through the lifting fog, we caught sight of the *Yelcho* steering through a maze of stranded bergs. An hour later we were homeward bound. I wish to place on record the good *moral* of the entire party, and especially the energy and ability of How, Hussey, Hurley, Macklin, M'Ilroy, Kerr, and Rickinson."

The *Yelcho*, which is said to be a boat of only 70 tons, was placed at Sir Ernest Shackleton's disposal by the Chilean Government, who generously manned and equipped it. A course was set which would enable the ship to approach Elephant Island from the north-west, Sir Ernest hoping that the ice had worked to the north-east. This proved to be the case, and, after steering in a fog through numerous stranded bergs, he was able to reach Wild's camp as already stated. The party is now on its way to England, which is expected to be reached by the end of October.

The Stefansson Expedition.—Six members of this expedition, all in good health, have returned to Nome. They report that Stefansson himself is remaining in the new lands which he discovered in 1915 north of Prince Patrick Land, and is not likely to return during the present season. The party which has returned, whose leader is Dr. Rudolf Anderson, has mapped the coastline from the Cape Parry peninsula for a considerable distance east, and has made topographical and geological surveys of a huge region which lies half-way between northern Alaska and the outlet of Hudson Bay. Sir John Franklin's charts have been corrected, large copper fields have been discovered, and ethnological and other scientific information has been obtained.

Commercial Geography.

The Baghdad Railway.—A recent article in the *Times* gives some further details as to the progress of this line and its connections, and the use being made of it by Turko-German troops. Among the minor points mentioned is that all trains south or east of Aleppo are using oak wood as fuel instead of coal, this being brought down in thousands of tons from the mountains for the purpose. The writer of the article states that in the region of the Amanus there is a gap in the railway line which is filled by a road twenty-six miles in length, and of very steep gradient. This road is of very unfinished appearance, and is apparently only for use till the completion of the tunnel. At the Taurus the break is forty-five miles in length, and is being filled at present by a motor service, the road having been rebuilt in such a fashion as to suit it for heavy motor traffic. The tunnel at Bozanti is at least three miles long, and, according to a report from the Swiss engineers in charge, is likely to require at least two years to complete. The Taurus is, however, at present pierced by a tunnel which has a small narrow-gauge track running through it, and this is being used for the transport of ammuni-

tion, but is not to form part of the permanent line. At Bozanti, which until the completion of the great tunnel is practically railhead, the writer of the article noted great activity on the part of the German and Turkish troops, who were well supplied with motor transport.

General.

Brazilian Geographical Congress.—The fifth Brazilian Geographical Congress was held at Bahia on September 7-16. There were twelve sections, devoted to the following subjects:—Mathematical Geography (astronomical geography, topography, geodesy); Physical Geography (1) (aerology, oceanography, geomorphology); Physical Geography (2) (hydrography, potamology, limnology); Vulcanology and Seismology; Climatology and Medical Geography; Biogeography (phytogeography and zoogeography); Human Geography; Political and Social Geography; Economic and Commercial Geography, including Agricultural Geography; Military and Historical Geography; Teaching of Geography, Rules and Nomenclature; Regional Monographs.

The late Professor James Geikie.—A biography of the late Professor James Geikie is now in course of preparation, and it would be a great convenience if those who have interesting letters or communications from him would forward them to the Editor of this *Magazine*. They would be carefully preserved and returned to their owners after being copied.

EDUCATIONAL.

Geography and Education.—A conference representative of the Classical, English, Geographical, Historical and Modern Language Associations have drawn up the following resolutions, which have received the approval of the councils of the five associations named:—That in the opinion of the conference: (1) It is essential that any reorganisation of our educational system should make adequate provision for both humanistic and scientific studies. (2) Premature specialisation on any one particular group of studies, whether humanistic or scientific, to the exclusion of all others, is a serious danger, not only to education generally but to the studies concerned. (3) Humanistic education implies the adequate study of language and literature, geography and history, which in each case should, at the appropriate stages of education, go beyond the pupil's own language and country. (4) The representatives of humanistic study would welcome from the representatives of the mathematical and natural sciences a statement with regard to those studies similar to that contained in (3). (5) In all reforms of education it must not be forgotten that the first object is the training of human beings in mind and character, as citizens of a free country, and that any technical preparation of boys and girls for a particular profession, occupation or work must be consistent with this principle. (6) Subject to the above principles the associations concerned would welcome a com-

prehensive revision of national education from the point of view of present needs. It is stated that "the resolutions are published in the hope that in any coming reconstructions of our educational system this attempt to restate the 'humanistic' position will mitigate the dangers incident to a violent breach of tradition and an excessive reaction against the past predominance of certain types of study. But it will be obvious that they are drawn up in no spirit of hostility or indifference to either scientific or technical studies, and their framers are anxious to co-operate in securing for these, as well as for the studies with which they are themselves more particularly interested, their due place in a national system of education." Co-operation and suggestions are invited: any communication may be addressed to the chairman of the Conference of the Five Associations, Professor T. E. Tout, Oak Drive, Fallowfield, Manchester.

NEW BOOKS.

EUROPE.

Past and Present at the English Lakes. By the Rev. H. D. Rawnsley. Glasgow: James MacLehose and Sons, 1916. *Price 5s. net.*

Canon Rawnsley is always sure of readers, and most of all when his subject is Lakeland. His latest volume contains a dozen papers relating more or less directly to this district, and all readable. As an enthusiastic guide, "A Hundred Miles of Beauty" should perhaps take first place. As a record of notable personalities there are the articles on Hartley Coleridge, and on Mrs. Dixon of Dove Cottage. "The German Miners at Keswick" and "The Home of the German Miners in Tyrol" tell of antiquarian research, and "Gough and his Dog" recalls a tale more striking than that of Greyfriars' Bobby. Ecclesiologists will learn with interest that, thanks to the investigations of Dr. F. C. Eeles, Crosthwaite Church can now claim the distinction, unique in England, of exhibiting on its external walls the full number of consecration crosses. Whatever the subject, Canon Rawnsley's pleasant style and numerous anecdotes are sure to claim attention. There are not many ministers who would have the boldness to extricate themselves from a difficulty by announcing, "Sarmint's slipt doun in t' neuk, and Ah can't get it oot, but tell ye what, I'll read yeh a chapter oot o' t' Bible that's worth three on't."

A List of Works relating to Scotland. [Owned by the New York Public Library on Dec. 31, 1914.] Compiled by George F. Black, Ph.D. The New York Public Library, 1916.

Of this catalogue but a few copies are being sent to this side of the Atlantic, and, as "a patriotic Scot," Dr. Black has sent one of the few to our Library. He is well known as an enthusiastic and painstaking librarian and bibliographer, and is to be congratulated on the production of this substantial volume of more than twelve hundred double-columned pages, in which are catalogued all the books and papers dealing with Scotland that were, as stated, in the New York Public Library at the end of 1914.

While of course primarily acting in New York in the usual function of a catalogue, the book will perhaps be mainly of interest and value over here as evidence of the high place held by Scotland in the estimation of cultured citizens

of the United States. The Introduction begins with this statement: "Although Scotland is a small country, it is no exaggeration to say that its influence in the world has been in inverse geometrical proportion to its size and population." It shows that poverty and persecution in Scotland scattered Scots folk, and among many places some found a home in what afterwards became the United States. "The first voice publicly raised in America to dissolve all connection with Great Britain came . . . from the Scotch-Irish Presbyterians." A long and notable list is given of Scots, men and women, famous in various departments of literature, science, arts, and administration.

It is interesting and gratifying to learn that the New York Public Library—and it is by no means singular among United States libraries in this respect—has set itself to make a very notable Scottish department in its book stock. It disclaims—and rightly so—the possession of a complete collection, but as Scottish geographers we may readily admit that the collection is "worthy of the country whose influence on the settlement, formation, and progress of the United States has been adequately recognised only within recent years." The catalogue, it may be noted, admits weakness in the department of books of limited local reference; but it is specially strong in its detailed listing of articles that have appeared in periodical publications, especially in the proceedings of many societies, including our own; indeed, as the compiler says, in this direction "not much of importance has been overlooked."

In brief, then, this catalogue shows the existence of a notable collection of Scottish books; is a good piece of bibliographical work; and is evidence of a pleasing *entente cordiale* between us and our cousins over the water.

ASIA.

Syria as a Roman Province. By E. S. Bouchier, M.A. Oxford: B. H. Blackwell, 1916. *Price* 6*s. net.*

Within the compass of three hundred pages Mr. Bouchier manages to give a strikingly interesting account of the Roman Conquest of Syria, and he entirely justifies the necessity for a manual of convenient size on this region, at one time flourishing but now neglected and decadent. With brighter days gleaming in the distance it may not be out of place to predict for the area a gradual recovery to usefulness and prosperity.

The volume is no bald dissertation on battles, sieges, and warlike operations, but an earnest and successful attempt to give a faithful, though necessarily short, account of the geographical and economic features, the peoples and their characteristics, the towns, literature, religion, architecture and antiquities of Syria and Phœnicia. The result proves the author to be possessed of keen and penetrating insight into the interaction of the forces at work during the Roman occupation, and classical scholars especially will record their appreciation of the untiring research and accurate scholarship displayed on every page of the narrative.

While it is unnecessary to say anything regarding the climate and physical features of Syria, attention may be called to the chapter dealing with the natural products and commerce of the region. The luxuriant vegetation of the lower stretches of the rivers "alternates with sandy areas, or it is cleared to form orchards or plantations of date palms. In both ancient and modern times wood has been liable to be displaced in favour of fruit-trees, of which olives, figs, vines, pomegranates, and walnuts were extensively cultivated." Irrigation was very largely employed, and agriculture was practised on the lower slopes of the mountains and near the courses of rivers. Large flocks of sheep supplied

abundance of wool. Mineral wealth was meagre, the iron for manufactures being imported from India, and copper from Asia Minor. Roman rule conduced to the development of trade, and the Phœnicians were the leading exporters of glass and metal work, linen fabrics and dyed stuffs. Other exports were wines, oils, dried fruits, and unguents. To carry on trade the Romans developed roads and trade routes in addition to those which had existed from earliest times. A feature of the book is the fine descriptions of some of the principal cities of the colony—*e.g.* Antioch, Berytus (city of streams), a university town, Damascus ("the eye of the whole East"), a great commercial centre, Apamea, a great military station, Sidon and Tyre.

The volume, supplied with map, plate of coins, bibliography and index, forms a contribution of value and importance to the increasing library dealing with classical subjects.

Through Russian Central Asia. By Stephen Graham. London: Cassell and Co., Ltd., 1916. *Price* 16*s. net.*

One usually looks for something fresh and unconventional from Mr. Stephen Graham, and in taking up this, his latest, book, the reader will not be disappointed in his expectation, for it is the record of a vagabond journey, undertaken alone and on foot, such as few, if any, men of British birth have ever attempted before. The first part of Mr. Graham's journey was made on the Trans-Caspian railways, from Krasnovodsk, through Merv, Bokhara, and Samarkand, and it is quite characteristic of the man that, on reaching the most eastern limit of the rail at Tashkent, he should shoulder his knapsack and set off to tramp through Central Asia as though he had been doing English country lanes. There is a real fascination in his description of the road, with its odd mixture of travellers of many races—Sarths and Khirgiz, Turkomans and Tartars, and Russian immigrants from Europe, the latter bound for their new homes, driving their cattle and carts laden with household goods, and singing in chorus as they marched onward into the unknown land where they were to make their new homes. Mr. Graham's account of the Russian scheme of colonisation from Europe, and of the conditions existing in the great empty spaces north of the Thian Shan Mountains, possess a special interest to-day, and many lessons may be drawn from the Russians' way of treating their problems of Empire. The settlement of this vast country appears to go on methodically, the Russian Government sending their agents to survey the land, and decreeing in advance how many villages are to be set down in each place for the reception of families from Europe. The days of fighting for possession of the new land date from the eighties of last century, when the Russians captured Merv, and the word *mervousness* was coined at Westminster. The methods of the new masters were undoubtedly harsh at first, "rebellions" being put down with severity and much slaughter, but "now Turkestan and Russian Central Asia are extremely loyal, peaceful, and happy Russian colonies." . . . "Never was such a stretch of territory, so many new subjects, or so much trade and interest won with so little trouble. It was won almost by military processions. It must be remembered that it could not have been held, nor would Russia have any real footing there to-day, but for the peasant pioneers who followed the armies and began settling the land. And the peasants would not have remained if the Government had not helped them with loans, found them suitable plots for their villages, and irrigated the desert."

We cannot follow Mr. Graham on his journey on through the land of the Seven Rivers, which lies between the northern spurs of the Thian Shan and Lake Balkash, until he reaches the river Irtish and the shoulder of the great Altai

range. Sometimes he got a lift in the tarantass of a friendly wayfarer, but mostly he footed it alone. His description of the country, alternately desert and a land well watered and blooming with flowers, of how he boiled his kettle by the wayside, and lay down in his sleeping-bag, lived on koumis and what scant fare he could buy from the tents of the nomads—all this has to be read to be appreciated. On the political side, and on the aspects of Russian expansion in Asia as it may affect our position in India and our relations with our Allies, Mr. Graham's views command the reader's attention. We cannot resist quoting the following :—

"The basis of friendship with Russia is not really trade, and no provision needs to be made to make a trade basis. We had plenty of trade with Germany, or Germany with us, and that did not make for friendship. On the contrary, the question of trade and of haggling over money is almost certain in the long run to lead to estrangement, or at least mutual disesteem. There has been a growing trade, but that has not led to the growing friendship. Friendship has been founded on real mutual admiration. We like the Russians, and they like us. The positive side of Russia profoundly interests us. Of course, we are not vitally interested in the negative side, the rotten conditions of life in certain classes, the faults of Russia, the seamy side of the picture. We are thoroughly aware of the ugliness of the negative side of our own life, and we would ask—do not judge us by that, that is not England. Similarly, in Russia we are interested in beautiful and wonderful Russia, in Holy Russia, not in unholy Russia. This positive side is comparatively unrealised here, for gossip and slander make more noise than truth, but it is a great treasure both for Russia and for ourselves in friendship. On the whole the prospects are good."

Mr. Graham mentions as a point worth noting the wonderfully cheap fares on the Russian trans-continental railways, which carry emigrants a thousand miles for 4s. 2d. of our money, or five thousand miles for 16s. 4d., and he advocates, as a post-war measure, a nationalised steamship service within the British Empire which would make it possible for our emigrants to travel long distances at similar rates.

Mr. Graham's is a remarkable book, and we venture to hope that it may find many readers.

BOOKS RECEIVED.

An Official Guide to Eastern Asia. Compiled by The Imperial Japanese Government Railways. Four Vols. Size, $4\frac{1}{4}$ by $6\frac{1}{4}$ inches. Pp. 2069. 82 Maps, 37 Full-Page Illustrations, and 410 Inserted Illustrations. *Price*, Vols. I. and IV., 14*s.* each ; Vols. II. and III., 10*s.* each. Tokyo, 1913-15.

A Bachelor in Japan. By Eric Erskine Wood. Demy 8vo. Pp. 98. *Price* 3*s.* 6*d. net.* London : T. Fisher Unwin, Limited, 1916.

The World (Junior Regional Geography). By J. B. Reynolds, B.A. Containing 78 Maps and Diagrams. Crown 8vo. Pp. viii + 279. *Price* 2*s.* 6*d.* London : A. and C. Black, 1916.

America in Pictures. By H. Clive Barnard, M.A., B.Litt. Containing 58 Illustrations. Large 4to. Pp. 64. *Price* 1*s.* 6*d.* London : A. and C. Black, 1916.

Highways and Byways in Galloway and Carrick. By the Rev. C. H. Dick. With Illustrations by Hugh Thomson. Demy 8vo. Pp. xxx + 536. *Price* 6*s. net.* London : Macmillan and Co., Limited, 1916.

Missione Stefanini-Paoli: Ricerche Idrogeologiche, Botaniche et Entomologiche fatte nella Somalia Italiana Meridionale, 1913. Con 22 figure, 33 Tavole e 3 carte geologiche a colori. Demy 8vo. Pp. xx + 255. Firenze: Istituto Agricolo Coloniale Italiano, 1916.

The Investigation of Rivers: Final Report. By AUBREY STRAHAN, N. F. MACKENZIE, H. R. MILL and J. S. OWENS. Special Publication. Demy 8vo. Pp. 93. *Price* 3*s.* 6*d. net.* London: Royal Geographical Society, 1916.

The Call of the West: Letters from British Columbia. By Captain C. F. J. GALLOWAY, R.M.R.E. With 135 Illustrations. Demy 8vo. Pp. 328. *Price* 12*s.* 6*d.* London: T. Fisher Unwin, Limited, 1916.

Summer Holidays in the Alps, 1898-1914. By W. E. DURHAM. With 57 Illustrations. Imp. 8vo. Pp. 207. *Price* 15*s.* London: T. Fisher Unwin, Limited, 1916.

A List of Works Relating to Scotland. Compiled by GEORGE F. BLACK, Ph.D. Demy 8vo. Pp. viii + 1233. New York: Public Library, 1916.

India and its Faiths: A Traveller's Record. By JAMES BISSETT PRATT. Large Demy 8vo. Pp. xii + 483. *Price* 12*s.* 6*d. net.* London: Constable and Co., Limited, 1916.

Agricultural Geology. By R. H. RASTALL, M.A. Demy 8vo. Pp. x + 331. *Price* 10*s.* 6*d. net.* Cambridge: University Press, 1916.

The Soul of the Russian. By MARJORIE and ALAN LETHBRIDGE. Crown 8vo. Pp. x + 238. *Price* 3*s.* 6*d. net.* London: John Lane, 1916.

Travels in the American Colonies, 1690-1783. Edited under the Auspices of the National Society of the Colonial Dames of America by NEWTON D. MERENESS. Demy 8vo. Pp. vi + 693. *Price* 12*s.* 6*d. net.* London: Macmillan and Co., Limited, 1916.

Vicente Añes Pinçon. By JAMES ROXBURGH M'CLYMONT. Royal Small 8vo. Pp. 82. *Price* 10*s.* 6*d. net.* London: Bernard Quaritch, 1916.

Map Reading and Panorama Sketching. By an Instructor. Crown 8vo. Pp. 61. *Price* 3*s.* London: Sifton, Praed and Co., Limited, 1916.

The Village Gods of South India. By Right Rev. HENRY WHITEHEAD, Bishop of Madras. Crown 8vo. Pp. 172. *Price* 2*s.* 6*d. net.* London: Oxford University Press, 1916.

Thinking Black: Twenty-two Years without a Break in the Long Grass of Central Africa. By D. CRAWFORD, F.R.G.S. Second Edition. Demy 8vo. Pp. xvi + 502. *Price* 3*s.* 6*d. net.* London: Morgan and Scott, Limited, 1914.

Questions Balkaniques. Par JOVAN CVIJIĆ. Pp. 79. Paris: Attinger Frères, 1916. *Presented by Prof. Jovan Cvijić.*

Coal Shipments: Parliamentary Paper of Session 1914-16. London, 1916.

Report of the Progress of the Ordnance Survey to the 31*st March.* London, 1916.

Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions, 1915. Vol. I. London, 1916.

Statement Exhibiting the Moral and Material Progress and Condition of India, 1914-15. London, 1916.

Statistical Abstract for the several British Self-Governing Dominions, Colonies, Possessions, and Protectorates in each year from 1900 *to* 1914. 52nd number. London, 1916.

Colonial Reports.—Gilbert and Ellice Islands (884); Weihaiwei (885); Zanzibar (886); Fiji (887); Sierra Leone (888); Turks and Caicos Islands (889); Gambia (890); Trinidad and Tobago (891).

Svenska Turistföreningens Årsskrift, 1916. Pp. viii + 450. *Värde* 4 *kr.* Stockholm: Wahlström och Widstrand, 1916.

Publishers forwarding books for review will greatly oblige by marking the price *in clear figures, especially in the case of foreign books.*

NEW MAPS.

EUROPE.

EUROPEAN WAR MAPS.

Stanford's Half-inch Map of the Battle Front between the Somme and Soissons.—Based on French Government Surveys. Scale 1 : 126,720. Coloured. Price 2s. 6d.

Stanford's Map of the Russian Battle Front in Europe.—Showing the approximate position in April 1915 and that held after the great retirement. Scale 35 miles to 1 inch (1 : 2,217,600). Coloured. Price 2s. 6d.

Stanford's Reproduction of Part of the German Official Map of Central Europe.—(1 : 300,000). Enlarged to the scale of 4 miles to 1 inch. Luck sheet. Price 3s. 1916. *Edward Stanford, Ltd., London.*

The "Daily Telegraph" War Map (No. 21) of the Belgian and British Fronts.—By Alexander Gross, F.R.G.S. Coloured. Scale about 2 miles to 1 inch. Price 1s. net. 1916. *Geographia, Ltd., London.*

INTERNATIONAL MAP.—Scale 1 : 1,000,000. The following new sheet has been compiled at the Royal Geographical Society under the direction of the Geographical Section of the General Staff. It is drawn and printed at the Ordnance Survey Office. 1916. Price 1s. net.

Paris, Provisional Edition, North M-31.

ASIA.

INTERNATIONAL MAP.—Scale 1 : 1,000,000. Compiled at the Royal Geographical Society under the direction of the Geographical Section of the General Staff. Price 1s. net.

Tabriz, Prov. Edition, North J-38; **Beirut,** Prov. Edition, North J-36; **Baghdad,** North J-38.

AMERICA.

CANADA. STANDARD TOPOGRAPHICAL MAP.—Scale 1 : 250,000 or 3·95 miles to 1 inch. J. E. Chalifour, Chief Geographer. 1916.

Nova Scotia, Yarmouth Sheet.

Ontario, French River Sheet.

MANITOBA, SASKATCHEWAN, NORTHERN AND SOUTHERN ALBERTA.—Maps showing Disposition of Lands. Corrected to January 1916. Scale 1 : 792,000 or 12½ miles to an inch. Prepared in the Railway Lands Branch under the direction of F. C. C. Lynch, Superintendent. 4 sheets.

Department of the Interior, Ottawa.

UNITED STATES GEOLOGICAL SURVEY.—**Geologic Atlas Folios.** 1915.

No. 195. **Belleville-Bresse,** Illinois.
,, 196. **Philipsburg,** Colorado.
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,, 198. **Castle Rock,** Colorado.

United States Geological Survey, Washington.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

POLITICAL BOUNDARIES.[1]

By Col. Sir Thomas Holdich, R.E., K.C.B., K.C.I.E.

It has been said that more wars have been caused by boundary disputes than any other source of political contention. Whenever there is a war there is, inevitably, a boundary violated somewhere or other as the direct result of military movements, but this is an effect, rather than a cause. The cause is to be sought for amongst a great complexity of human motives—it may be a spirit of aggression—the sheer lust of world-power, or simply an irrepressible demand for more space for an expanding people. This everlasting changing and shifting of boundaries which, whether regarded as cause or effect, is the accompaniment of every great world-war would, one would have thought, have led long ago to a more careful consideration of the principles which should govern the setting out of boundaries between nationalities in such manner as to render them the most efficient factors in the preservation of peace; and yet the amount of really useful literature on this subject is exceedingly small. The complexity and importance of it has, I think, hardly been realised, and certainly no other subject could lend itself better to scientific discussion from either the military, political, or the geographical standpoint, or start more free from preconceived notions and dogmatic opinion. One or two able writers have indeed attempted to define the requirements of an international boundary from a theoretical point of view in a manner which is wholly admirable, in so far as it is based on a belief in the regeneration of humanity, and the existence of an honest desire for a millennium of peace and goodwill which should lead nations to dwell together in unity. Unfortunately there are very

[1] A paper read at the Newcastle Meeting of the British Association to Section E (Geography).

few signs of this happy tendency in these days. It does not much matter in what direction you look for signs of yearning loving-kindness amongst people who, being ordered and ruled from separate and distinct centres of government, still exist as rivals in the great world-field of commercial development and wealth-hunting, you will not find them. In no direction whatever are such symptoms significant enough to warrant the adoption of any scheme of boundary fixing which would lead to the mingling together of the human fringes of the nations and promote mutual assimilation in a spirit of brotherly love and common ideals.

Here we are faced with one of the difficulties which besets the discussion of the subject. What is a nation? or rather what are those conditions of government and geographical environment which constitute the basis of a nationality, binding all its individual members into one definite and complete whole in the consciousness of unity of purpose and ideals? An American writer defines a nation as "a population of an ethnic unity, inhabiting a geographic unity under a common form of government." He is careful to add that the exceptions are quite numerous enough to prove the rule. We had better leave it at that, and remember that under the great political empires of the past there were no nations; and that with the increase of democracies in the world will come an inevitable increase of international boundaries. It is, however, with the spirit of the nation, the sentiments which underlie its national ideals, that we have to deal in practice when laying out a line of separation, and this, so far as it affects boundary settlements between civilised communities, appears at first sight to be a very complicated problem. The bonds of ethnic affinity; a fervid community in religious sentiment; a mutual basis of agreement and aim as regards cultural development or political aspirations, have all been cited as sentiments strong enough to ensure such a peace-loving and peace-promoting assimilation as should render the existence of a dividing line a merely nominal geographical incident. As a matter of fact, none of these sentiments weigh for an instant against that perfervid form of patriotism which is inculcated by education (just as religion is inculcated), and supported by the irresistible effects of environment and self-interest. I do not mean to say that self-interest (in itself a mean and sordid motive) is at the root of patriotism, but I do mean to say that it is very easy to place self-interest on a very high pedestal of morality, and then to imagine that it is patriotism; and that it is a matter of the very deepest concern to any government which values the great principle of love for one's country, and the spirit of self-sacrifice in that country's cause, to see to it that the highest patriotic ideals, whilst yet uncontaminated by the breath of self-interest, are fostered and inculcated during the earliest phases of education.

It might be thought that community of origin and of language would be a powerful agent in the promotion of peace between peoples who share it. Unfortunately it seems to count for little or nothing when boundary disputes arise. Such international family quarrels are often the bitterest, nor can we say that community of religious faith is any stronger

as a binding agency than community of language and ethnical affinity. Such influences may almost be ignored, as well as those which arise from common aspirations after certain forms of culture, when men's passions are aroused by the greed of territorial expansion or the bitter grievance of its curtailment. It is quite sufficient for all practical purposes if we lump all such matters of sentiment together, and regard the total effect of them as "the will of the people." The will of the people is, in effect, the outcome and expression of all these influences, together with that greater, nobler, and more inspiring sentiment which the Japanese call "bushido," and which we call patriotism.

I have been concerned officially in the settlement of many boundaries, but never have I experienced (nor have I ever heard of) a settlement in which the people concerned on either side were so happily disposed towards each other as to ask only for a fair division of interests, and such a nominal hedge between them as would permit of neighbourly fraternisation and the interchange of courtesies. On the contrary, boundary disputes seem to possess quite an unreasonable and sometimes incomprehensible faculty for stirring up the very worst elements of international hatred and passion, and we are forced to the conclusion that a boundary settlement involves the partition of conflicting interests, which must be adjusted as far as possible so as to prevent those interests from ever clashing or morally interfering with each other again. So long as man is a fighting animal he must be prevented from physical interference with his neighbour by physical means. I grant that this is not a high ideal, but what else can we suggest? We have had bitter experience of late years, which should teach us again an old lesson of the value of high ideals and altruistic sentiment where men's passions are concerned, in this unredeemed world so full of beauty and of desperate evil; and we must reluctantly admit that the best way to preserve peace amongst the nations is to part them by as strong and as definite a physical fence as we can find. In short, a boundary must be a barrier, and the position of it must be influenced largely by the will of the people. These then are the two governing conditions of boundary-making. Let us consider the latter condition first.

All authorities seem to agree (there are not many of them) that the annexation of any territory directly against the will of its inhabitants is a political blunder. The assimilation of its people with the conquering nation is a slow, and often an impossible process. The Germans have not assimilated the French of Alsace and Lorraine: the English have hardly assimilated the Irish, and where race antagonism is believed to be supported by self-interest real assimilation seems to be hopeless. An admixture, so to speak, may be effected mechanically, but real chemical fusion never takes place. Under such circumstances it is seldom indeed that the acquired territory is a safe and thoroughly sound unit in the political entity. It adds little or nothing to the strength of a nation, although it may be economically useful, and it is apt to be a very thorn in the side of any government, an undoubted danger in times of stress and adversity. The expression of the people's will varies infinitely in form. In the savage and uncivilised countries of the black man there

may be no possibility of consulting it. The questions at issue may lie between white nations, and the black man has little to say to the disposition of his own property. But amongst civilised countries there is always a "will," and it is usually definite exceedingly. Various suggestions have been made as to the best way of ascertaining that will. A plebiscite even has been suggested. I cannot imagine a surer way of starting an armed conflict. The process of vote-catching is never one which lends itself to the promotion of good feeling and brotherly love at the best of times, even when the object is a political issue only half comprehended. When it is a matter of close personal interest involving a clear issue of local gain or loss, it certainly would stir up to its very depths the identical dispute which the boundary is planned to decide. Nor in practice will it be found that any such resource is necessary. However complicated may be the admixture of those sentiments which together combine to form a definite will on the part of the disputants, the expression of a people's will in terms of the majority is usually definite and unmistakable. When opinions are fairly divided, and the expression of them is weak and wobbly, inclining first one way and then another, weighing advantages against disadvantages, and coming to no decided conclusion, then indeed sentiment may well be allowed to give way to these physical conditions which should govern the selection of the line of partition, strong geographically, a barrier for defence against aggression, an age-long guarantee for the peaceful development of culture and commerce without interference or fear on either side.

Let me repeat that the reasons for giving first consideration to the sentimental values in a boundary dispute is the obvious fact, long ago confirmed by history, that no nation gains in strength by the organisation of a people latently hostile, and prevented by hereditary or ethnical instinct from any process of assimilation which will cement the bonds of political union.

Setting aside then the question of international sentiment, we may consider those problems which beset the physical side of the question, especially the relations and influence of geography and environment on a frontier, together with some few of the most important rules which should guide first the delimitation, and then the demarcation of a boundary; and I should like to commence by insisting, as far as I can, on some definitions which seem to be called for, judging from certain reports dealing with boundary matters which I have lately read, and on which I have been asked to express an opinion. The "delimitation" of a boundary is not the actual process of marking out its position in the field. That is better understood by the word demarcation. Delimitation is a process of defining, by means of maps and protocols, where a boundary should be demarcated in the field, and it is usually the function of those high political authorities who meet together to represent the interests of either nation concerned, and to decide on such geographical evidence as they can get what either side is prepared to accept. Too often it is assumed that with the delimitation of a boundary the great question at issue is finally settled. If the delimitation is based on perfectly sound evidence, and if the protocols and other technical

documents provided for the guidance of the demarcators are expressed both clearly and correctly, the subsequent business of demarcation becomes merely a secondary process giving effect in the field to that which has been decided in high conclave. This has seldom been the case in the past owing to a want of appreciation of the necessity for exact geographical knowledge, both practical and theoretical, on the part of the political delimiters; and it has happened that the terms of delimitation have led to far-extended disputes and to a process of demarcation which in one important instance at least has lasted for more than a century and a half. Another matter on which some confusion of mind has been apparent, even amongst officers of special ability in this form of public service, is the distinction which lies between a frontier and a boundary. If you define this distinction shortly it amounts to this—a boundary denotes a line and a frontier, space. The boundary limits the frontier, and it is the expansion of the frontier which so frequently renders a boundary necessary: a frontier is but a vague and indefinite term until the boundary sets a hedge between it and the frontier of a neighbouring state.

There are, in my opinion, certain fixed principles which are applicable to all boundaries no matter where they may be traced, whether amongst the gloomy forests of the Upper Amazon or the peaks and pinnacles of the Andes, amongst the sun-baked hills of Africa, or through the intricacies of the rugged borderland of India; whether in the black man's wilderness or the white man's populous and overcrowded provinces; and these principles, which are dependent on physical attributes, can never be safely ignored. The last half century has witnessed a perfect orgy of boundary making, and latterly the demand of scientific requirements (notably of geographical exactitude in definition and demarcation) have been fairly met. We can certainly claim that of late years our boundaries have been shaped scientifically by competent demarcation guided by the text of delimitations which, if not technically perfect, have at least been free from the ridiculous elementary errors of past generations of politicians, who were ignorant of the very first principles of geography.

I need not weary you with any repetition of past mistakes, mistakes that have cost us the value of many millions sterling, and have more than once reduced this country as well as other countries to the verge of war. I have referred to them often enough elsewhere. It is quite probable that we shall, ere long, be faced with a comparatively new phase of boundary problems where there can no longer be the excuse of want of sound map knowledge of the districts concerned to account for misleading and inaccurate delimitations, but where ethnical interests of the most important character will possibly present painfully complicated knots for disentanglement. In no case, however, can I imagine that the wishes of the majority of the people concerned will be difficult to ascertain, and in certainly the great majority of cases it will be those main principles involving physical attributes which will prove to be the most important factor in the settlement.

We should, in the first place, be absolutely certain that on both sides

of the settlement there is the same governing idea of a contract which is to secure the permanent peace of the border. Whilst this is the just and righteous aim of the boundary maker; whilst he has nothing in view but that which is to develop the influences of peace and the interests, commercial and cultural, of the peoples between whom he has to set a hedge, he must beware of any reservation which may become apparent during the process of settlement which would indicate that a loophole is to be left in that hedge through which advantage may be taken hereafter, when the hour shall strike, of some weakness which may facilitate a sudden and determined overthrow of the whole construction. In the strongest sense of the term then I must insist that a boundary must be a sound and unbroken barrier as far as possible, and that it must be selected most assuredly with the great object in view of hindering in every possible way any proposed scheme of violation. As a barrier it may be natural or it may be artificial. In either case it must be made as secure as nature or art can make it. Peace can only be based in this imperfect world on security. Security, as one able writer has justly put it, means "armament." In blood and tears have we at last learnt the lesson. May no specious idea of a new millennium blot it out from our minds, and may our political representatives, impressed at last with the lessons of the war, set about designing new political boundaries with lines as strong as they can be made. Prevention of war is much better than cure, better by the lives, it may be, of millions of brave men and the tears of thousands of women, and it may quite easily be prevented to a very appreciable extent by limiting the capacity of angry disputants to get at each other.

How are we to secure these strong boundaries? To a certain extent nature helps us, and where nature steps in with a really sound and impracticable fence nothing in the world can be better. Almost every geographical feature has already been impressed into the service of the boundary maker. We have mountain ranges, rivers and lakes, seas and deserts, all doing duty, to say nothing of countless minor features which make up the topographical plan of the earth's surface. Incomparably the best of these are mountain ranges. It may happen that they stand alone, untouched for miles by artificial designs, as great and impassable border lands, in the midst of which the boundary follows the great divides, majestic, unapproachable, immovable, subject to no vicissitudes of natural force short of violent earthquakes, requiring no artificial boundary marks for definition, no ridiculous waste of money over demarcation, no expenditure in boundary upkeep, presenting on either hand a magnificent wall of defence, unbroken, impressive, defiant. It is true that here and there across all the great mountain systems of the world there run the tortuous and narrow ways culminating in passes connecting the wide plains on either side. Over these passes and through their narrow ways armies have been conducted from time to time, and history records several notable instances of great invasions conducted across great mountain systems, but I venture to think this is not a phase of history which is likely to repeat itself. The power of scientific defence forbids it. Under any circumstance opportunities for transgressing the boundary

and trespassing beyond it into foreign fields are not many, and the trespassing is a matter which entails serious consideration, and the delay of preparation. I need not enlarge on the value of mountain boundaries. You are all familiar with such notable instances as the great wall of the Pyrenees, the more intricate Alpine system, and the magnificent continental divide of the Andine Cordillera, all of which have been pressed into international service; but to my mind the most amazing natural boundary in the world is that of the snowy Himalayan ranges which part India from the great northern uplands. These ranges, combined with the important offshoots of the Hindu Kush and its extensions, absolutely and securely hedge in India from any northern threat of invasion, leaving but one comparatively short north-western gateway doubtfully available through the whole wide extending frontier from Burma to Persia. If we cannot hold that gateway we had better leave India.

Next to an impressive mountain system we must be content with lesser divides, lesser in altitude, and inferior in the quality of difficult approach. If we cannot have Himalayas we may make good use of Carpathians. I need hardly refer to the excellent use which has been made of this formidable, but by no means unapproachable mountain system, not only historically, but notably during the varying phases of the present war. The Crown Colony of Galicia lying flat beyond these mountains has proved to be nothing but weakness to the Austrian Empire, which has been forced to defend her south-eastern frontier by the Carpathian ridges, rather than by the fortresses and rivers of Galicia. Whatever may be the significance of the mountain system as a geographical divide between the nations, it is of obvious importance that the actual boundary should follow the parting of the waters. To take a remarkable instance of the weakness which results from a failure to observe this condition, I may refer to the northern Italian frontier. Here the main watershed has been intermittently abandoned: valleys are crossed; local interests are divided; racial and social affinities are disregarded; mountain crests are traversed with an air of readiness which betokens a nominal rather than an actual boundary: and a permanent international grievance has been established which this war may, or may not, set right.

Failing a definite uplifted watershed, the ordinary divide between the heads of minor affluents of a river basin is quite a useful alternative. The advantages are those of permanence, definiteness, and economy, added to a certain command in altitude which renders it important as a military feature. It is seldom that a divide alters its position from the action of natural causes—on the whole it may be regarded as a permanent feature unlikely to be shifted or affected by the wear and tear of nature's destructive forces, and it is definite and often unmistakably recognisable without the aid of artificial landmarks, which cost money and are perishable. Consequently it is readily and quickly adapted to the purpose of boundary-making. Judging from the map of Europe, it may be said that these advantages have not been overlooked in the past. To a very great extent it is the divide between the rivers, and not the

rivers themselves, that have been adopted for international purposes. Rivers, perhaps, rank next in value to mountain chains, and they certainly play an important part in the great political partitioning of the world. They are at least unmistakable and definite features requiring little artificial assistance, and they do often serve the purpose of a barrier. Indeed it entirely depends on the conditions of environment whether a river makes a good boundary or a very bad one. Where the surrounding country is a waste of trackless forest or of wild upland, and where the river is confined to a narrow channel in a rock-bound bed, it may be admirably adapted for a boundary. The Oxus from the plains of Badakshan to its glacier sources in the Pamirs is a case in point. Where it is confined within a narrow bed, rock-bound, and sunk beneath the general level of a wild stretch of deserted upland in its upper reaches, it makes an excellent boundary. Where, however, it emerges from the mountain regions into the plains, and spreading itself into a complicated system of waterways, amongst which the main channel is indistinguishable, meanders westward, it is really no boundary at all. It may be crossed without much difficulty in many places although it is unbridged, and in its navigable reaches it is essentially a Russian river. There is a tendency in the case of every navigable river to become the exclusive property of the most pushing nation on its banks. The Rhine was always claimed by Germans as *our* river, even when it parted France from Germany. Lakes have been adopted freely as geographical features lending themselves to boundary-making, and, like deserts, they have on the whole proved efficient, even if the exact position of the dividing line is but ill-defined in their midst. There is indeed this great advantage about both of these geographical features; it is seldom a matter of importance that there should be exact demarcation. There may be islands in lakes, or oases and wells in deserts which have to be accounted for in the partition, but beyond them, in the great wide sweep of inland water, or the sand spaces of a sun-dried wilderness, there is seldom the necessity for striking a distinct artificial line.

It would be interesting had we time to trace a geographical analogy between a desert frontier and a sea frontier, and to show how it has happened that through long ages of history a desert-girt land of promise and development has owed continued peace and progress to its environment just as much as a sea-girt island. It may happen that no geographical features of any significance are available for the satisfaction of the boundary-maker, and that continuous and obvious artificial means have to be employed to make a boundary plain. Even with the best assistance of nature artificial methods of marking a boundary will always be necessary where man's own artificial impress on the earth's surface is encountered. Passes over the heights and roads traversing less conspicuous divides have to be denoted, and the gateways of a country or a state demand careful acknowledgment; but independently of such obvious points, on which it is not necessary to dwell, it very frequently happens that for thousands of miles the natural features (whether divide or river) are not marked enough to advertise the existence of a boundary without a line of pillars or marks of some sort at distances of intervisi-

bility. A divide even may include marshy flats from which rivers drain in opposite directions, or cultivated areas may intervene, so that at the best of times there is no getting away from artificial expression altogether. It is, however, the employment of means such as are wholly and purely artificial, where nature not only has no hand in the arrangement, but where her gentler efforts are traversed and discarded that so many ridiculously bad boundaries come to grief. The straight line, for instance, whether it represents a parallel of latitude, a meridian, or just a line projected on some particular azimuth, is almost invariably bad. It possesses no elasticity, it is often most difficult to determine, it is expensive and terribly tedious in the process of evolution. It may cut in two local interests of great importance, and play the mischief with a well-defined frontier. The worst mistakes in delimitation have occurred where a meridian (undetermined by exact geodetic measurement) or a parallel of latitude has been the weak resource of an ignorant arbitration which is dealing with a strictly geographical problem without waiting for proper geographical illustration. A straight line is generally an indication of geographical ignorance, a last resource when topographical information is wanting, so that it need not surprise us that it has in the ignorant past been distinctly popular. It has always proved to be immensely expensive, and I could occupy your time for hours in recounting historical instances of its adoption with the evil financial results thereof. It is, however, to the credit of European diplomacy of the past that there are not many straight lines in Europe; there has, indeed, been no excuse for them, for there cannot be many square miles of the continent that have not served as the basis for military action leading to a certain amount of exact topographical knowledge since Cæsar first conquered Gaul. What interests us at present, chiefly, is that particular phase of boundary-making in the future, which is to provide for the security, and, through security, for the peace of the quasi-civilised communities of Europe and the Near East. If I am right in assuming the general principle governing the selection of a boundary line to be that of securing a barrier, clearly we are landed at once in questions of military defence as a necessary corollary.

At the present time the principle for which we are fighting is that of maintaining the integrity of small nations; and the principle which apparently tends to govern the evolution of national societies, both small and great, is that of the democracy. As democracies increase, and empires are restricted, so will boundaries, together with the division of international interests, increase; but it must be remembered that the bed rock of all social evolution is the everlasting question of population. Thus the right of expansion in order to meet the imperious demand of multiplying people will promote boundary disputes and frontier wars as long as the world lasts. So that the security of a frontier is a matter of increasing importance in the world's economy, inasmuch as we can never expect an international convention to regulate the output of population in the same way that the output of armament or ships may be regulated, although one is just as important as the other in the interests of peaceful international evolution.

What then is to be the nature of the political boundary of the future from the military point of view if we wish to attain the security which is the only guarantee (and which will continue to be the only guarantee) for peace? So far as regards the actual line which denotes the boundary and limits the frontier on either side, there will be no great departure from those principles of selecting strong natural features, to which I have already alluded, and these natural features will in most cases lend themselves readily to military defensive purposes. Consequently we may assume that the mountain ridge—or the divide—will be adopted wherever possible. If we have learnt anything from the war, we have learned the enormous advantage to defence which is given even by a slight command in altitude. It is true that river flats and marshes have figured largely in the strategy of the war, in Poland, on the Russo-German frontier, and in Mesopotamia: and that the skilful use of marshes and inundations has largely affected the results of the campaign, but we may very safely say that no such accidents of topographical configuration would ever be selected as the basis of a boundary in preference to the advantages conferred by an elevated line. An open space of marsh-land, even if traversed by a definite river channel in its midst, could not often occur in European configuration as a useful alternative to the divide; so I do not imagine that in the redistribution of political boundaries at the close of the war, no matter where they may take place, there will be any great departure from the old order which adopted elevated positions and placed strong fortresses at intervals to guard frontiers. Nothing has occurred which need shake our faith in the value of this military precaution for the security of the frontier. Where the dividing line is unsupported by strong geographical features, such as are of themselves of military significance, the construction of fortresses, wherein may be gathered large military forces of sufficient strength to render it impossible to pass them by or ignore them, will still be considered imperative. It was the strength of the line of French forts from Belfort to Verdun, facing the Vosges Mountains and the Meuse, which determined the initial strategy of the German Campaign, and directed the advance through Belgium as indicating the line of least resistance to Paris. It was the gallant defence of Liège which destroyed the full effect of the great initiative, and gave priceless opportunity for mobilisation to the Allies. It is the Rhineland fortresses, and not the Rhine itself, which protect the western frontier of Germany when the hour comes for France to strike back. The unexpected collapse of Antwerp, of Namur, and of Maubeuge does little to modify this opinion. I shall be surprised if in the long future history does not point to the defence of Verdun as the pivot on which the whole fortunes of the war turned. Along with fortresses and with the controlling system of railways (with which we cannot be concerned just now) there will be new developments on or near the boundary which will be the outcome of present experiences. The rôle of trench-digging and of earthworks, which is comparatively new to European campaigning, and which has time and time again proved the one insuperable obstacle to rapid advance, will not be lost sight of or neglected in favour of

more impressive permanent works. Boundaries will be selected that admit of the linking up of natural features by a tracery of trenches and field works infinitely intricate, whilst artillery and all the mechanical war paraphernalia with which we have lately become acquainted will find their place in the general scheme. Indeed it seems that the European boundary of the future will be something more than the artificial impress of a line on the face of Europe, having no further significance than that of a hedge. It may well become an actual physical military barrier bristling with obstruction and points of steel, so complete and effective in its military appointments as to approach very closely to realising the ideal of absolute security. Thus will it really serve to diminish the probability of attack, and at any rate to induce long and very careful consideration before its violation is undertaken. It may be said that I am suggesting a defensive fence round every state that has any consideration for its own security such as might prove a serious bar to the exchange of friendly amenities. I fear that it is so, but my suggestion only indicates that which will, it seems to me, inevitably happen. Anyhow it is freely open to discussion, and I claim to do no more than briefly outline these principles which I consider must govern a subject on which there has been so far singularly little opinion expressed.

GENERALISATIONS IN GEOGRAPHY, ESPECIALLY IN HUMAN GEOGRAPHY.[1]

By George G. Chisholm.

Professor A. P. Brigham of the Colgate University, Hamilton, New York, in the learned and valuable presidential address on "Problems of Geographic Influence," which he delivered to the American Association of Geographers at its meeting in Chicago in December 1914, published in the fifth volume of the *Annals* of that Association, states that in geography "our goal is broad generalisation," but he bewails and illustrates at the same time the injury done to the study of geography by hastily formed generalisations which excite the distrust of men of scientific bent. He rightly insists that if we make generalisations in geography we must make them with the same exactness as in any other subject. That does not mean, of course, that the generalisations referred to must be universally applicable in all circumstances without qualification, but merely that they must be accurately expressed in terms that correspond with the facts upon which they are based.

But that makes it necessary to be quite clear as to what is meant by geographical generalisations. It seems to me that to know that, we must know what geography means. But, unfortunately, Professor Brigham is unwilling to give us a definition of geography. He declares that he "will not try to go where angels have trod with devious and faltering

[1] Paper read at the Annual Meeting of the British Association, Section E, September 1916.

steps. Sometime we shall have a definition of geography, but not now."[1] For my own part, however, I feel I cannot take a step without giving some indication of what we must understand by geography in the consideration of the subject at the head of this paper. All are agreed that whatever else geography may be, it includes a study of influences connected with place.

Now that definition is wide enough to include the whole of physical geography, and in that branch of the subject no difficulty for the most part is presented. Generalisations can be established under that head which will satisfy all the demands on the score of necessity and universality required of laws of nature. But after all what are generalisations in physical geography? They are merely laws of physics in the widest sense applied to the conditions on or near the surface of the earth. They are sub-generalisations, corollaries derived from more general laws belonging to other sciences, mostly from consideration of the joint action of laws with which different branches of science are concerned. And yet there is one case in physical geography in which the conditions presented in nature are so complex that men of science have failed to arrive at a satisfactory solution. The case I refer to is that of the diminution of mean temperature with altitude at, or near, the surface of the earth. Some such cases present no difficulty, at least in theory. But here let me point out, for the sake of exactness in expression, that it is wrong to speak of altitude as being, in any circumstances, the cause of a diminution of mean temperature. When we speak of the diminution of mean temperature with altitude, that is merely a shorthand expression which, in some cases, is quite convenient, because capable of easy analysis. It is so, for example, when we are speaking of the diminution of temperature with altitude in the free air as observed by means of captive balloons, or in the case of mountains in the trade wind zone exposed almost constantly to the same winds. But it is otherwise when we come to speak of the diminution of temperature with altitude on plateaus. We are perfectly assured that the situation on a plateau involves somehow or other a diminution of mean temperature as compared with that at sea-level, but there is no possibility of making an intelligible statement as to the influence of altitude as such in bringing this about. The reason is that in the cases already referred to, where the analysis of the convenient shorthand expression is easy, we are in fact summing up with reference to their effect at various altitudes the operation of various laws in physics provable by observation. Take, for example, the simplest case, diminution of temperature with altitude in the free air. The facts that have to be taken into account are these, that the air derives comparatively little heat directly from the sun, and that (except where the weight of cold air is the chief cause of differences in temperature between the higher and lower atmospheric strata) the principal causes that affect the temperature of the air act from the ground upwards. That makes it quite easy to understand that the mean temperature should be lower the greater the distance from the ground.

[1] *Problems*, etc., p. 14.

Supan, in his *Physische Erdkunde*, tells us that Mr. Bigelow has tackled this problem of the diminution of temperature with altitude upon plateaus by a very complicated method.[1] I have not seen this paper, and I am afraid that if I had an opportunity of looking at it, I should not have mathematics enough to be able to understand it. But Supan says that he is rather mistrustful of the value of the method in view of the result arrived at by Mr. Bigelow, and I feel the same want of confidence. The result at which Mr. Bigelow has arrived is that the rate of diminution of mean temperature with altitude on plateaus is about 0·33° C. per 100 metres. Converting that into the most convenient statement for the purpose of reduction into degrees Fahr. I find that that corresponds to a diminution of mean temperature equal to 0·181° F. per 100 feet. Let us apply this figure to two cases to which it seems to me the reduction factor should be fairly applicable, if it is applicable anywhere. The cases I have in view are Calgary and Edmonton, in the province of Alberta, Canada, both situated on nearly the same meridian: both to the east of the Rocky Mountains, though one is about 2½° to the north of the other, and Calgary nearly 1200 feet higher than Edmonton. The Canadian *Year-Book* for 1913 gives us monthly mean temperatures for both these places for a period of twenty years, and in the following table I give these mean temperatures for the months of December, January, and February, and June, July, and August, as compared with those of places nearer sea-level in the interior of Europe[2] in approximately the same latitude:—

TABLE showing the mean temperature of the winter and summer months at Edmonton and Calgary (*a*) as calculated from actual observations; (*b*) as reduced to sea-level by Bigelow's reduction factor; as compared for Edmonton with Berlin and Bromberg, for Calgary with Cologne and Leipzig (*a*) calculated, (*b*) reduced to sea level by Hann's reduction factor.

	Alt.		Dec.	Jan.	Feb.	June.	July.	Aug.
	Feet.		F.	F.	F.	F.	F.	F.
Edmonton,	2390	(*a*)	18·9	6·5	9·2	57·1	61·0	59·2
		(*b*)	23·2	10·8	13·5	61·4	65·3	63·5
Calgary,	3550	(*a*)	20·3	12·4	13·5	55·3	60·6	57·5
		(*b*)	26·7	18·8	19·9	61·7	67·0	63·9
Berlin,	136	(*a*)	32·8	32·8	33·6	62·9	66·7	64·9
		(*b*)	33·2	33·2	34·0	63·3	67·1	65·3
Bromberg,	162	(*a*)	29·2	27·9	28·8	62·2	65·1	62·8
		(*b*)	29·8	28·5	29·4	62·8	65·6	63·4
Cologne,	197	(*a*)	36·8	35·9	38·5	62·3	65·8	64·6
		(*b*)	37·5	36·6	39·2	63·0	66·5	65·3
Leipzig,	387	(*a*)	31·2	30·6	32·4	61·2	65·0	63·2
		(*b*)	32·5	31·9	33·7	62·5	66·3	64·5

[1] Fourth edition, p. 77.

[2] The figures for the European stations are Buchan's mean for the fifteen years, 1870-1884, as given in vol. xxi. of the "*Challenger*" *Report*.

I think a mere glance at these figures, especially those for January and February, will be enough to rouse distrust as to the value of the reduction factor obtained by Bigelow by his complicated method.

I refer to this case because, notwithstanding the difficulty encountered in this problem, the construction of isothermal charts with temperatures reduced to sea-level assumes that the problem is solved. Meteorologists have to apply a reducing factor in arriving at the data upon which such charts are constructed, but in the circumstances indicated it is not to be wondered at that the factors employed by different meteorologists don't agree. Buchan applies uniformly the factor 1·11° F. for every 300 feet of altitude; Hann 1° F. for the same difference (0·5° C. per 100 metres). Wild's factor is equal to 0·58° F. per 300 feet for the winter months, and 0·96 for the summer months. Now Sils Maria, in the Engadine, at the altitude of 5940 feet above sea-level, has a mean January temperature of 20° F.; a mean July temperature of 52°. By Buchan's factor this gives us a sea-level temperature for Sils, in January, of 42° F.; by Hann's one of 40° F., and by Wild's one of 31° F., a difference of as much as 11° F. in the sea-level temperature calculated from the same datum and supposed to be arrived at in each case with great precision. It is on such grounds that I attach very little importance to isothermal charts where the lines are drawn through mountainous, and especially plateau regions, and I looked upon it as a great improvement in geography when Herbertson introduced his maps of thermal regions[1] in place of isothermal charts. The actual thermal regions as originally drawn by him must of course be susceptible of improvement with the increase of the number of data at our disposal; but in the case of these maps we are at least dealing with things that have a meaning, whereas I cannot but think that isothermal charts based on the idea of reduction of temperature to sea-level have no meaning whatever. In the fourth edition of Supan's *Physische Erdkunde* Wild's practice of adopting a different reducing factor for the winter and summer months is recommended, but in the fifth edition the author has changed his mind and adheres to the practice of Hann, who adopts the factor of 0·5° C. per 100 metres for every month in the year. We are told by Supan that we should bear in mind what it is that an isothermal chart actually professes to show: that it does not say, such would be the distribution of the temperature if the whole earth were a continuous plain at sea-level, but it takes into account the actual superficial configuration with all its modifying influences, and eliminates only the thermal effect of altitude. But then, one must consider that altitude has no thermal effect except in virtue of physical laws the operation of which at every point depends upon the actual superficial configuration, so that if all the modifying influences of superficial configuration are taken into account there is no effect left to eliminate.[2]

[1] See *Geographical Journal*, vol. xl. pp. 518-32.

[2] The opinion here given as to the value of isothermal charts in elevated regions is not new. Similar views are expressed by Mr. L. C. W. Bonacina, in *Symons's Meteorological Magazine*, No. 521 (June 1909), p. 95, in his notes "On M. Angot's Studies on the Temperature of France."

But a case like this in physical geography is exceptional, and it is mainly in connection with human geography that demands are frequently and rightly made for greater exactness and clearness in the statement of general laws. It is mainly, in fact, human geography that Professor Brigham has in view in the paper referred to in my opening remarks. This reference introduces quite different considerations. What do we mean by generalisations in human geography? According to the conception of geography with which we are working in the present paper, we must mean influences connected with place acting upon man. And certainly such influences can be recognised, are capable of clear categorical statement. But here an important distinction must be noted. Some of these influences act independently of man's will, others do not, and these latter, therefore, are affected by all the varying unknowable circumstances that may contribute to the determination of his will. Ratzel, indeed, assures us[1] that the freedom of the human will in no respect alters the fact that man in his geographical distribution is dependent on external conditions. But this, it seems to me, is a rather carelessly expressed statement, to which I shall return. The distinction that I have just made does in fact seem to me an important one. It is only influences of the first kind that can be expressed in terms of absolute law. But under this head we must recognise not merely laws that are absolutely universal but also empirical laws, such as may be expressed in percentages or some other form of numerical statement. But in the application of so-called laws of human geography in which the human will comes in as a modifying factor, the uncertainty introduced by this factor must always be distinctly kept in mind. It is for that reason that I accept without qualification the dictum of Professor Brunhes to which Professor Brigham has called attention, "that every truth concerning the relations between natural surroundings and human activities can never be anything but approximate: to represent it as something more exact than that is to falsify it, is to become anti-scientific in the highest degree."[2] Ratzel says the same thing on the same page as that just cited, where, indeed, he goes on to express himself more carefully on the subject of the human will. "Just as little," he says, "as other sciences which draw man into their sphere can anthropogeography find natural laws which can be comprehended in mathematical formulas. Like the individual man the people also exhibit free will, but their will whenever it expresses itself in deeds must reckon with the terrestrial conditions that limit it." The failure to distinguish these two classes of laws has introduced into geography much confusion, has perhaps been the principal cause of confusion.

But here let me introduce some further considerations. First, just as in physical geography, so also in anthropogeography, the laws with which we have to deal are laws derived from other sciences or corollaries from such laws. That is true whether the will of man be concerned or not, but in the former case we must pay due regard to the facts of

[1] *Anthropogeographie*, vol. i. p. 100.

[2] *Scottish Geographical Magazine*, vol. xxix. (1913), pp. 362-3.

human nature. We speak of influences connected with place, but it would be wrong to speak of influences of place. As I have already pointed out in this *Magazine*,[1] no influence connected with place can be recognised except in virtue of facts that are not geographical. The place of cultivation of rice and of lucerne is determined, among other things, by the fact that rice will, and lucerne will not, grow in a swamp; that ordinary rice has in fact to be grown in its early stages under water. But these are facts not in geography but in vegetable physiology, and that they concern man arises from the facts of human nature—human physiology, and the desires resulting from such physiology. I may here seem to be labouring the obvious, but sometimes that is necessary for the sake of clearness. It is, I think, the neglect to bear in mind this consideration, however obvious, that has in some cases misled Ratzel, so that, as Brigham expresses it, his "sometimes noble and rousing periods leave us in a jungle of thought."[2] In reply to Ritter's conception of geography, represented as the realisation of that of Playfair in his *System of Geography* published in 1808, Ratzel says: "In opposition to such conceptions we must emphatically say that geography has as its primary task the exploration and description of the earth without respect to the human or the historical, and that the independent fulfilment of its task must precede co-operation with history in the field of anthropogeography."[3] But in all description there must be some principle of selection. Description cannot be an enumeration of all observed facts in the minutest detail. In such selection we all feel that the tacit principle of selection is mostly a reference to man and his requirements as determined by the laws of Nature generally. But Ratzel's disposition to make general statements, with implied or expressed subjects in terms of place, leads him into many an obscure and questionable statement. "Similar locations give rise to similar political models. . . . Germany and Bornu are as different from each other as Central Europe is from the interior of Africa, but central location has produced the same peculiarity in each, a source of power to the strong nation, of ruin to the weak."[4] The sameness of this peculiarity is not clear to me. "Nations that are accustomed to a limited territory, as were the Greeks, always search for a similar limited area. On the other hand, the Romans discovered a main factor of empire-building in their judicious agricultural colonisation of broad plains." This sweeping generalisation can hardly but suggest more than one question: Was it not a Greek civilisation that was spread over an area in western Asia by the marvellous conquests of Alexander the Great? And, on the other hand, did the Roman power really occupy any extensive area when it began to follow the policy of which Ratzel speaks? The section in Ratzel's *Anthropogeographie* on Situation is full of obscurities, much enhanced by the lamentable facility belonging to the German language for the formation of abstract nouns, for which it is very difficult to find any definite content. "What is geographical situation?" he begins. I would naturally reply, geographical situation

[1] *Scottish Geographical Magazine*, vol. xxvii. (1911), p. 562.

[2] *Geographical Review*, p. 5. *Anthropogeographie*, vol. i. p. 85.

[4] Helmolt's *World's History*, vol. i. p. 81.

is angular distance from the equator and a given meridian, and vertical distance from an assumed sea-level. But, no; Ratzel's reply is: "In situation we have first of all the extent and form of a region." . . . Further, there is also *Zugehörigkeit*. We have no English word "belongingness," and I am glad we have not. "Situation is also action and re-action (*Wechselwirkung*)," and so forth. In this section, indeed, there are numerous observations of importance with respect to non-geographical facts that have to be taken into account in estimating the influence of situation—that is, in estimating geographical influences, but they are of a kind with which geography deals under every head, and to put them under the separate heading of situation is merely perplexing.

Further, it has also to be borne in mind that the value of geographical conditions varies with the circumstances of the time; another matter that I have already discussed and illustrated in the pages of this *Magazine*.[1] These changes in conditions may be entirely physical, such as the silting-up of harbours, or they may be connected with the inhabitants of different regions, and in the latter case it will be noted that the will of man is apt to be involved. No one perhaps has given more abundant illustration of this than Ratzel, but it is a fact that frequently runs counter to some of the too broad statements about place to which he is apt to give expression.

Thirdly, one may note that general statements in human geography, when the human will is concerned, are all the more likely to approach the universality of an absolute law, the more imperious is the urgency that leads to the behaviour on the part of man that is taken for granted in the statement. This consideration gives very general validity to the laws illustrated with reference to the six essential facts which Brunhes[2] ranges under the three groups—(1) the sterile occupation of the soil (houses, roads); (2) the cultivation of crops and the rearing of animals; (3) the using up of animals and the wholesale destruction of forests, animal species, and so forth.

Let us now return to our distinction between the two classes of laws in human geography, and take one or two illustrations. Buckle's *History of Civilisation in England* has been much blown upon in consequence, as it seems to me, of the fact of his frequent assertion with the same absoluteness and confidence of laws of the second kind as he does some of the first. Yet some of the statements which he makes in his second chapter, "On the Influence Exercised by Physical Laws over the Organisation of Society and over the Character of Individuals," are sound and pregnant, and are generalisations entitled to be called geographical in so far as they are statements of influence connected with place. Such, for example, are the observations that the inhabitants of cold countries have their respiration accelerated, and imbibe at each respiration a greater volume of oxygen than the inhabitants of hot ones, and that these require less food than those of cold countries for the keeping up of animal heat. But when he goes on to speak of the people of India as

[1] Vol. xiii. (1897), pp. 475-87.

[2] *La Géographie Humaine*, 2nd ed. pp. 62-66.

"condemned to poverty by the physical laws of their climate,"[1] of "all nature conspiring in the civilisations exterior to Europe to increase the authority of the imaginative faculties and weaken the authority of the reasoning ones,"[2] one is obliged, or ought at least, to pause and reflect. With reference to this latter contention one may return to a previous enumeration by the author of examples of that physical oppression to which this influence is ascribed, including the liability to earthquakes, and then one cannot but ask, What of earthquake-shaken Greece and her position in the development of the human race? and recognise the truth of the editor's note that the explanation of the phenomena must include recognition of the part played by Asiatic and Egyptian culture in promoting the Mediterranean civilisations, and the latter in the culture history of northern Europe.

The direct and indirect influences of climate on man are so great that it is under that head that we find an exceptional number of the hasty and unguarded generalisations of which historians and others have a right to complain. Professor Brigham refers us to Ratzel's warning against "the climate philosophers" who, to suit their purpose, twisted and hacked nature in all directions, and whose doctrines on that account were not without logical interest of a negative kind.[3] The temptation to recognise broad climatic influence is frequently too strong even for those of trained scientific intellect. "Climate," says Moore, "is the most potent of all factors in the environment of races." That may be true, but the statement is so broad that we require a good deal fuller content for it to be of any use as a generalisation in geography; and when the author goes on to observe, "it is climate and soil, place, heredity and form of government that produce vigorous or weak peoples," so much else is introduced that the value of the first statement becomes all the less. We must proceed to more special studies of climate for the light we are seeking, and in Ellsworth Huntington's book on *Climate and Civilisation* we get some examples of scientific method. He says, for instance (p. 8), in giving an account of attempts to ascertain the effects of climate on a man's daily work, "I have taken the records of over five hundred factory operatives in the cities of New Haven, New Britain, and Bridgeport, in Connecticut, three or four thousand operatives in southern cities from Virginia to Florida, and over seventeen hundred students at the United States Naval Academy at Annapolis, and the Military Academy at West Point. In most cases each person's record covers an entire year, or at least the academic year. All the records have been compared with the various conditions of the weather."

I do not quote his results because I am now concerning myself only with his method, which must here be recognised as thoroughly scientific. But we find a somewhat sad contrast in comparing some neighbouring passages in the same book. On page 4 he tells us, "Many good authorities assert that the climate of [Egypt, Greece, and Mesopotamia] was the same two or three thousand years ago as now. This view is rapidly

[1] P. 15 of the edition by J. M. Robertson.
[2] *Ibid.*, p. 74.
[3] *Anthropogeographie*, vol. i. p. 83.

losing ground, but those who believe in a change are uncertain of its nature." But turn to page 6. There we find that "it is noteworthy for all times of favourable climate in countries such as Egypt and Greece the people were apparently filled with a virile energy which they do not now possess." The cautious statement of page 4 has here silently acquired, we do not see how, a remarkable degree of positiveness.

And now let me point out what I consider to be the greatest danger of laying too great stress on any one cause as affecting human development. It is apt to lead us to neglect other causes or blind us to their importance. If, for example, the supreme importance of climate as an agency in civilisation is urged upon one's mind, one cannot but think of the vast areas of America which have now long been undergoing a rapid process of development. They have awaited the arrival of the white man to enter on that process. If resort is made to the other simple but non-geographical explanation, race, then we are reminded by ethnologists that nearly the whole of America was occupied by one race, and that there were two other regions in which before the arrival of Europeans a fairly high degree of civilisation was attained: one of these, all deductions being made, one of the most remarkable that the world has to show throughout recorded time. Shaler expressly denies that the retardation of the social development of the Indian of the temperate parts of North America was due to any original lack of intelligent capacity, and, recognising that the explanation sought for involves the consideration of a great variety of circumstances, points, among other geographical conditions, to the lack of domestic animals, and the lack "of those isolated tracts of land such as are afforded by the peninsulas and fertile mountain valleys of the Old World"—tracts in which a tribe well protected by geographical boundaries might "work out within itself the motives of a civilisation."[1] In any case North America had to await the arrival of the white man for the attainment of any high degree of civilisation in the temperate zone, and I have already pointed out elsewhere the opportunities afforded for development in a very sparsely settled new world when it came to be occupied by people with the experience of Europe behind them.[2]

If then the geographer recognises it as his task to take into account all influences connected with place, he must be constantly looking round in search of such influences and trying to estimate their relative value. As Brigham says: "We cannot stop short of physical, social, and economic phases of influence all tangled in different fashion":[3] all of them, we may add, possibly in a manner that the geographer cannot ignore.

One obvious reflection suggested by these examples is that where the human will has to be reckoned with in the estimation of influences connected with place an enormous difference must be made by variations in opportunity presented in different circumstances. Only consider the great and sudden changes under this head made by the discovery of America, as just pointed out; by the discovery of the sea-way to India,

[1] N. S. Shaler, *The United States of America*, pp. 33-5.
[2] Stanford's *Europe*, vol. ii. pp. 261-3.
[3] *Ubi supra*, pp. 18-19.

even more striking and sudden in this respect: the invention of a variously serviceable steam engine, and the introduction of locomotion by steam, etc., etc. Ellsworth Huntington, we have seen, harps on changes of climate as explaining the vicissitudes of Greek history, but surely we must recognise that Ratzel and Philippson are right in calling attention to the peculiar opportunities enjoyed by Greece in the brilliant period of her history as a prime factor in the explanation of that splendour. "Of what use," asks Ratzel, "were descriptions of the geographical complexity of Greece on Grecian history in which the decisive point that Greece occupies a medial position between Europe and Asia and between Europe and Africa was not insisted upon above all? Everything else is subordinate to the fact that Greece stands upon the threshold of the Orient."[1] As I have pointed out elsewhere,[2] the important point that Philippson insists on is that "in ancient times, and more particularly from the sixth to the fourth century B.C., Greece was so situated as to be an intermediary through which a great part of the trade in the valuable products of eastern Asia with the newly opened lands of the rapidly developing western Mediterranean was carried on."

In conclusion, I will attempt to give greater definiteness to the observation made as to the cautions and qualifications with which generalisations in human geography are to be taken, and the way in which the action of the human will is tacitly assumed in such generalisations, by considering and analysing two or three examples: and, as it is cautions and qualifications that I am going to emphasise, it may not be out of place to cite one or two on which I have ventured myself.

In all the editions of my *Commercial Geography* I have emphasised and illustrated, under various headings, the equalising tendency of commerce, with a resulting tendency to the development of the resources of different regions of the world to the utmost extent possible in existing conditions. The underlying assumption is that commerce is, as a matter of fact, carried on for profit, and that those engaged in it are likely to push their efforts after profit as far as they can. Here we are dealing with no very recondite motive, and hence we do find numerous and, indeed, almost universal confirmations of the tendency. I have given some illustrations in the first edition of the book on page 4 and the following pages, and in some of the subsequent editions on pages xxvii to xxxviii, and I may now add a further illustration, not without interest at the present time, bringing us down to a period later than the last edition of that work, that of 1911. The illustration which I have in view is taken from the external trade of the United States, which of late years has been becoming less and less one sided, coming to show a smaller and smaller preponderance of raw produce among the exports. Taking the average of quinquennial periods from that ending June 30, 1875, to the period of three years ending June 30, 1914, we find that the United States has increased her exports of cottons, iron and steel wares, machinery and leather, from 4·1 per cent. to 21·6 per cent. of the

[1] Helmolt, *World's History*, vol. i. p. 80.

[2] *Geographical Journal*, vol. xxxvi. (1910), p. 684.

total value of its exports, in absolute value from less than 4½ millions sterling to 101 millions. It is not worth while making a comparison for the same periods in the trade of the United Kingdom as regards the proportion of our export trade coming under these four heads, for relatively these show in the aggregate a considerable decline, but the absolute increase has only been from 118 to 205 millions sterling, a good deal less than that of the United States. Still it would be wrong to speak of changes of this kind as illustrating an absolute law except in the form of a tendency.

Many geographers have dwelt on the causes promoting the growth of towns, and in this respect I have perhaps been as guilty as most. Still it should be remembered that all that can properly be said under this head is that certain situations favour the growth of large towns. There are comparatively few sites of which it can be said, even if a great population needing a large town may be postulated, that a great town must necessarily exist there. More frequently this can be asserted of seaports barring wilful political opposition. But to realise the importance of the human factor in the creation of seaports, one has only to think of how long Bremen was "a seaport without ships," how well justified the boast is that "Glasgow made the Clyde and the Clyde made Glasgow," but how, on the other hand, there is no similar boast that "Goole made the Humber and the Humber made Goole," so that the trade of that inlet is divided between Hull and Grimsby with the young sister of the latter, Immingham, only a comparatively small extra of a special character being left for Goole. A few inland situations may, with the above postulate, be pointed out as of such a nature as almost certainly to lead to the development of a great town: such, for example, as the situations of Paris, Hankow, Chicago, Toronto, but mostly it might be said that some neighbouring positions might serve the purpose equally well. The root cause of the development of such towns is generally what Mackinder, in his *Britain and the British Seas*, has well termed nodality,[1] that is, the degree in which the local conditions favour convergence of routes on a given point. The underlying assumption here is that men want to buy and sell to suit their own purposes, and that the most convenient point for that is where merchants most do congregate. To appreciate the importance of nodality one has only to consider how street corners are occupied by public-houses, banks, big drapers' establishments, and other properties betokening abundance of cash and the desire to make more. But remember, not every example of physical nodality gives rise to actual commercial nodality. Hence in this case, also, we should speak of nothing more than a tendency.

For such reasons I eschew the term "control" in speaking of the influence of geographical conditions on human affairs, preferring the terms "favour" and "hinder." I do not say that the term "control" may never be justly used in geography. The history of the empire of Greenland is as concise and complete as the natural history of the snakes in Iceland. That is one of the cases which Ratzel had in his eye when,

[1] Second edition, p. 329.

as I ventured to say, he expressed himself rather carelessly. By way of illustrating the view that the freedom of the will does not affect man's dependence on external conditions, he subjoins: "Man is banished from the polar as well as the driest parts of the earth just as much as plants and the lower animals."

For my last illustration I will take a generalisation, for which the geographer and economist who propounds it, Edward Van Dyke Robinson, Professor of Economics in the University of Minnesota, and author of a text-book of Commercial Geography, claims all the necessity and universality that can be asserted of the most firmly established of the laws of nature, and on the ground of which he undertakes to make an unqualified forecast of the future. "The cause of war is as permanent as hunger itself; since both spring from the same source, the law of decreasing returns. So long as that persists, war must remain, in the last analysis a national business undertaking, designed to procure or preserve foreign markets—that is, the means of continued growth and prosperity."

Well, I confess, that if the assumption which Professor Robinson evidently looks upon as so absolutely unquestionable that a doubt never enters his mind, must really be taken as representing an unalterable fact, then I hardly see how his conclusion can be avoided. But is it so absolutely certain that men must go on for ever multiplying so as to be obliged to fight for the very means of subsistence? It has long been known that France, at least, has already ceased to multiply in this reckless manner. This used to be looked upon as a sure sign of a decadent nation. But will any one venture to say so now? Lately the tendency to a reduction in the rate of increase of population has been noted as a spreading phenomenon, and I have already called attention in an article printed in this *Magazine*[1] to a forecast involving a totally different estimate from that of Professor Robinson. "If," says Mr. Westergaard, a Danish statistician, "we now try to glance into the future, we may expect that a conspicuous decline of the birth-rate will by and by appear in all civilised countries. There are some countries which will very soon be reached by this movement, and . . . we must not forget that everything moves quicker in our days than in the good old times."[2] It is to be remembered that what we desire, what acts on our will, is affected by increase in our knowledge. Consider the influence of our growing knowledge of the importance to the whole community of maintaining the health of the people, and our greatly extended knowledge of the methods of sanitation. There is, as it seems to me, no little ground for believing that the steps taken with a view to the improved health of the community in different countries have gone far in the direction of bringing about a healthier birth-rate as well as a healthier death-rate. And if we look to the future we cannot measure the possibilities that may run counter to the assumed necessity for such an unrestrained growth

[1] Vol. xxix. (1913), p. 462.

[2] In an article entitled "Horoscope of the Twentieth Century," in the *Bulletin de l'Institut International de Statistique*, vol. xvii. (1908), p. 110.

of population as must lead to recurrent war. What, for example, might result from the full realisation of the degree in which the countries of the world are already so knit together that one cannot suffer without the other suffering more or less also? What if it were, I will not say perceived, for that would involve a degree of assurance for which there is no justification, but if it were conceived in this country that it is of no great advantage for Lancashire to be obliged to sell cottons to the people of India, China, and Africa in their present state of poverty at prices which they can afford to pay, and on that account it came to be thought in the interest of the people here that the standard of living in India, China, and Africa should be raised as high as possible?[1] It seems to me that the realisation of such ideas, if that could in any way be brought about, could not but have a great effect in checking the reckless multiplication of a proletariat on the lowest scale, and removing the conditions on the strength of which endless wars are prognosticated. These, it may be said, are only vague possibilities, but they are indicated only as such in order to show the doubts attaching to a very confident geographical generalisation.

FRANCE: A REGIONAL INTERPRETATION.[2]

By H. J. Fleure, D.Sc., Professor at the University College of Wales, Aberystwyth.

(*With Sketch-Maps.*)

It is generally agreed that we owe a tribute of unaffected admiration to the great Republic, and it is hardly the purpose of this address to labour that theme. France has worked nobly in the cause of humanity in this war, and one cannot but wonder at the misunderstandings which led some to consider her degenerate before the war. Her ruthless probing of the Dreyfus scandal, under the lead of the men who now rule, should have taught the unchanging strength of her soul: but Victorian politics, soaked with pan-German influences, distorted even that struggle for ideals into evidence of degeneracy. It would have been wiser to contrast it with the weaker treatment of a scandal of the same period by England.

[1] A somewhat similar thought is expressed in one of the most remarkable books that have appeared in consequence of the war, Naumann's *Central Europe*. He remarks (p. 188 of the translation by Christabel M. Meredith—"If all nations are to trade with one another, the conditions of life of the workers in every zone must continually grow more alike, methods of work must approximate to one another, . . . average requirements must arise, and a housekeeping scheme for mankind belongs not to the inconceivable for those who think in centuries." Not that Naumann makes any such application of this thought as is indicated in this paper. See, on the one hand, pp. 7 and 164-5, etc., as to the indefinite prospect of future wars, and, on the other hand, pp. 203-4, 210, for Naumann's views on the population question. The book has recently been received by the Society (see p. 544) and will be reviewed in full here at a later date.

[2] A paper read before Section E (Geography) at the Newcastle Meeting of the British Association.

But let that pass. Our concern here is to show what makes France of such importance as a contributor to, as a maker of, our civilisation.

Shall we fall back upon the hypothesis, so favoured of pan-Germanic writers in England as well as in Germany, the hypothesis of race superiority? That doctrine is mythical enough, as we know from Houston Chamberlain's vagaries—once accepted, like so much other pseudo-history, by English writers keen on economising thought. If we did, our reply from France would be the deadly Gallic laughter, the laughter which kills.

We must seek elsewhere for our hypothesis, and in doing so we must avoid our continual error of estimating France from Paris, instead of from her peasantry. A metropolis is an important factor of civilisation, but it is inevitably something of a parasite; and Paris, with all her glory, sins like the rest.

The shortest statement one can venture of the greatness of France is that in France is the natural ending of several lines that start in the limitless expanses of Asia: it is also that in France the ways across the continent from the great human sea to the more backward north are shortest and clearest, and that from all antiquity. It thence follows that France, often painfully and even tragically, has woven into her life almost every strand of experience or of character that has attempted to influence Europe. More than that, the circumstances, the opportunities, of France herself are such as to have drawn her on to the inbuilding of all these varied contributions, or, to change the metaphor, to the weaving together of all these diverse strands into a tissue, which has thence acquired a surpassing richness of diversity in unity.

A few rather obvious comparisons between France and Spain will help to make the physical circumstances of France stand out more clearly. Both lands are built of basins set around plateaux of ancient rocks and separating those plateaux from the great fold mountains. In the case of Spain the high barren plateau of the Meseta occupies two-thirds of the surface; in France the *Plateau Central* is but one-sixth perhaps (Fig. 1). In Spain, the Ebro basin is isolated from the sea and is separated from Andalusia by an immense width of the Meseta plateau. The Andalusian basin, rich and fertile as it is, has but a few back attic windows giving on the Mediterranean: its links are rather with the Atlantic and Africa. The Douro basin, Leon and Castille, with all its significance, is high on the plateau and ends westwards in the cliff-slopes that bar it from Portugal, or in the ravines among the Galician hills. None of these regions can sum up the peninsula, and its centre is the artificial Madrid, consciously created as if to spite nature on the dreary height of the central Meseta, with its winter cold and summer drought that so limit the wealth of Spain.

In France (Fig. 1), on the other hand, the magnificent sunny window of Provence leads the sunlight and the ideals of the Mediterranean up the long corridor of Burgundy. It is a richer Andalusia, much more closely associated with the main pulse of European life. Aquitaine, like the Ebro, is the least of the three great basins of its country, but yet how different. It has a sunny clime tempered by sea-breezes and

the rain, while the Ebro lands are on the dry side of the plateau. It opens to sea by Gironde and Charente, while the Ebro merely cuts the coastal range of Catalonia. It is a land of sunny wine that after all links with the Mediterranean by the gate of Carcassonne, be it never so strictly guarded.

And then, the Paris basin (Fig. 1), with its majestic sweep and its

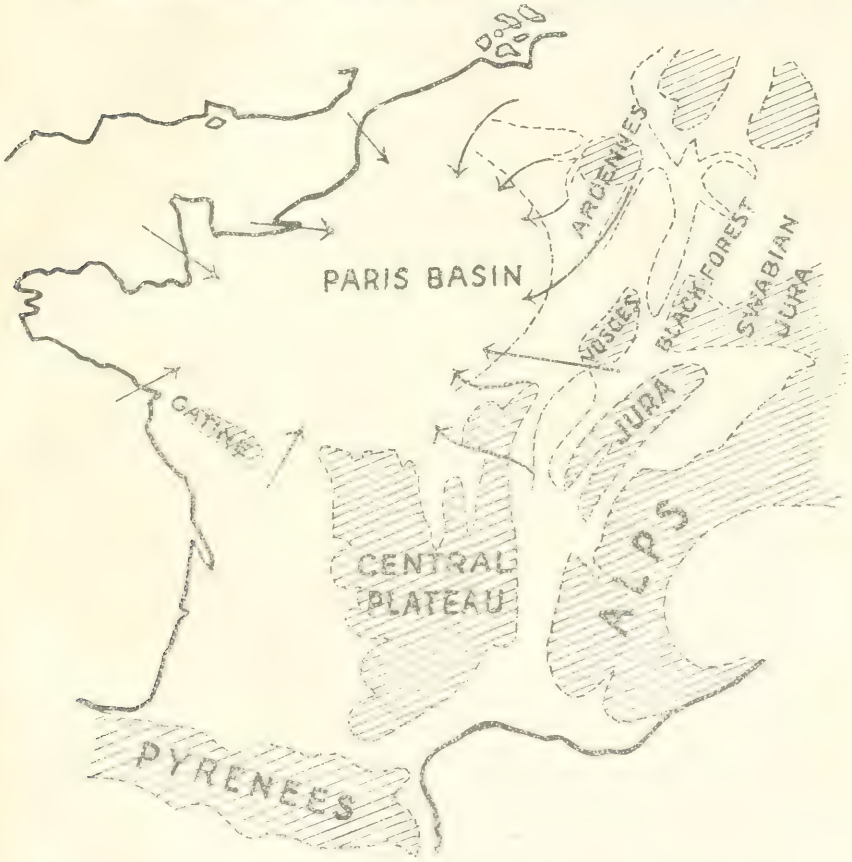

FIG. 1. Main physical features. Higher lands shaded. Rhine lower lands [illegible] Eastern edge of Paris basin and main upper part of Saône basin marked by broken lines. Arrows indicate ways into the Paris basin.

many gates, is incomparably different from that of the Douro. The gate of Dijon links it with the Rhone and the Mediterranean, furnishing a way for civilisation, a veritable way of light. The same gate, however, is also open past Belfort to central Europe, and that way has many associations with the civilisation of the Early Iron Age, with some of France's unfortunate attempts at material expansion, as well as with the unfinished series of barbarian assaults against civilisation. Then

there is the gate of Metz and Verdun, that of the Meuse and Sambre, that of Ypres, all links with central and northern Europe. Through these gates ideas of the Paris basin, its master university and its architecture, have spread Rhinewards, and through them time after time have armies swayed to and fro. The gate of the Channel from Dunkerque down to Le Cotentin has seen the civilisation of Europe spreading across to Canterbury and to Winchester, and before they existed to their predecessors in the great rôle they played for centuries as the ways into England, each gathering up the traffic of a group of little ports. This same gate has also given entry to the northerners, who, whatever their early barbarism, so speedily became apostles of Gallic civilisation.

The gate of the Open Sea from St. Malo to Nantes has its historic relations with America, and its seafaring folk contribute much to the life of France, while its prehistoric memories also will need treatment in the sequel. Finally, the gate of Poitiers brings the Paris basin into touch with Aquitaine, and so with Spain and Africa, and indirectly with the Mediterranean: it has memories of conflict with the Arab as well as with the English.

The Paris basin is such that its centre has become the focus of expression for France, and even for Europe. The people who have streamed towards it feel its subtle attraction, find the opportunities they need, become unconsciously permeated by its civilisation. Its influence spreads quietly, and, as it were, inevitably; it is an influence which has done more than almost all else for the life of the English plain on the one hand and of the Germanic lands on the other. Only the deliberate creation of the open sore of Alsace-Lorraine could stop that penetration and thus bring about the dehumanisation of the Germany of our day.

The climates of France add to the country's rich diversity. The sun of the Midi ripens the olive (Fig. 2) as well as the vine, and where it hardly suffices for the olive in the Rhone corridor it still makes the mulberry a success, and so contributes to the high-grade industry of silk. In upper Burgundy and in Aquitaine, where for different reasons some summer rain does fall, though the sun is still fairly hot, we get the great vineyards as well as maize and other crops of corn. In the Paris basin, with its sub-oceanic climate modified in winter from the cold centre of Europe and in summer from the sun of the south, we have the cultivation of wheat with the vine in spots sheltered from the sea. The apple makes a fairly agreeable substitute where sea-winds keep summer temperatures down below the needs of the grape.

The Mediterranean climate, with its fruit-trees mingled with garden produce under the sheltering branches, gives man a fair return for moderate labour. If he works wisely he may give much of his thought and interest to those things above bread alone by which man lives. It is a home of ancient civilisation, of the civic spirit, which is the expression of the natural, moderate, and steady increment from reasonable industry. The rest of France, outside the olive region, demanded of man a larger effort before it became a land of increment, but it was

nevertheless so near to this condition that the preliminary effort did not need to be so prolonged as to hinder Burgundy, Aquitaine, and the Paris basin from sharing in and developing in their own ways the inspirations pulsing from the great sea, before the pulses had died down and inspiration had hardened into formality and dogma.

The contrast with the Prussian plain is a painful one. The mediæval inspiration touches France and makes her a light of the world.

FIG. 2. Regions of cultivation of olive (cross hatched), mulberry (lined), and vine (stippled, with coarse stippling for some of the most important vineyards).

It has almost faded ere it reaches the cold German plain, and so makes there but a thin veneer easily rubbed off by Luther. The work of Henri IV. and Richelieu has many faults, but it makes Paris a capital of mankind. Berlin copies Paris a century later but without its inspiration. Napoleon's shame is at least touched with romance, and even with the high purposes of the great Revolution: the evil Prussian copy of it in our day needs no discussion.

So much for the general theme; we need to study France in more

detail, noting the factors of her life and of its expression in her varying regions.

It has been said that France offers the best northward ways across the continent, and we naturally think of that one (Fig. 3) which, as Mr. Peake has shown, since the last part of the Bronze Age has been a highway of trade and civilisation, namely, that of the Rhone corridor and the northern edge of the Paris basin on to Calais and Boulogne. But before the primeval forests were penetrated, between what are now Lyons and Viviers (Fig. 3), men used the way along the limestones of the Causses and the bare, wind-swept edge of the central plateau from Carcassonne past Correze to Cornouailles in Brittany, and another along the sides of the Pyrenees to far Corunna in Spain (Fig. 3). It is very significant that this is in part the route of later pilgrimage to Saint James of Compostela, and so we get an understanding of some reasons why this pilgrimage appealed so strongly to the Celtic west, as well as a new light on some of the origins of French literature, so much of which grew up along this pilgrim way, and so grew from the Celtic-Mycenean foundation. Along that venerable road there are stones marked to guide the pilgrims, and the megalithic tradition is certainly much in evidence. Those who choose to reflect on the relation of Chaucer to the British pilgrim way, a road of immemorial tradition, will realise the meaning more fully. Needless to say, the way sketched out here across France is not to be considered a road in the sense in which we now use that term. It is rather a zone along which exchange, percolation, and occasional movement would occur.

The old ways across France are the dolmen lines (Fig. 3), the ways of Merlin and his wizardry, perhaps of the trade in tin and copper and gold: in fact one of the ways in which the Mycenean civilisation reached the west and Britain to give us more than we ever suspected until quite recently. Archæology is pointing out ever more clearly, and anthropology is enforcing the argument that there was a Bronze Age Mycenean domain in the far west, probably a refuge as the period came to its end, which kept its old life for centuries after eastern Gaul had learned the use of iron. The romances of the Mabinogion and of pre mediæval Gaul are connected with this ancient life of the west, which had its centre probably in Ireland, the land of gold; and through this we are affiliated to the ancient life of the pre-classical eastern Mediterranean and the Nile.

The coming of iron seems to have made a tremendous stir in the west, and, at this time or just before, a way was hacked through the forest from upper Burgundy to Provence, and to the Straits of Dover (Fig. 3). The Roman influence spread up this way, so the older road became a bypath, and probably for this reason was able to retain the traces of its ancient life down to our own time. This makes Aquitaine a curiously interesting study with its traces of many ages and many influences, as we shall see.

Provence feels the Greek and Roman influences and becomes very characteristically Mediterranean with its cities gathered around Forum and Senate and Temple, with its written law, its habit of discussion and

contract, its leisure for thought and for expression in building and sculpture, typifying the height of man's triumph there over the material world. Its openness to the sea brings it thoughts and products from many lands. It has much to relate: it must make literature as well as art: its theatres are a part of its fame. It bows to the barbarian in the

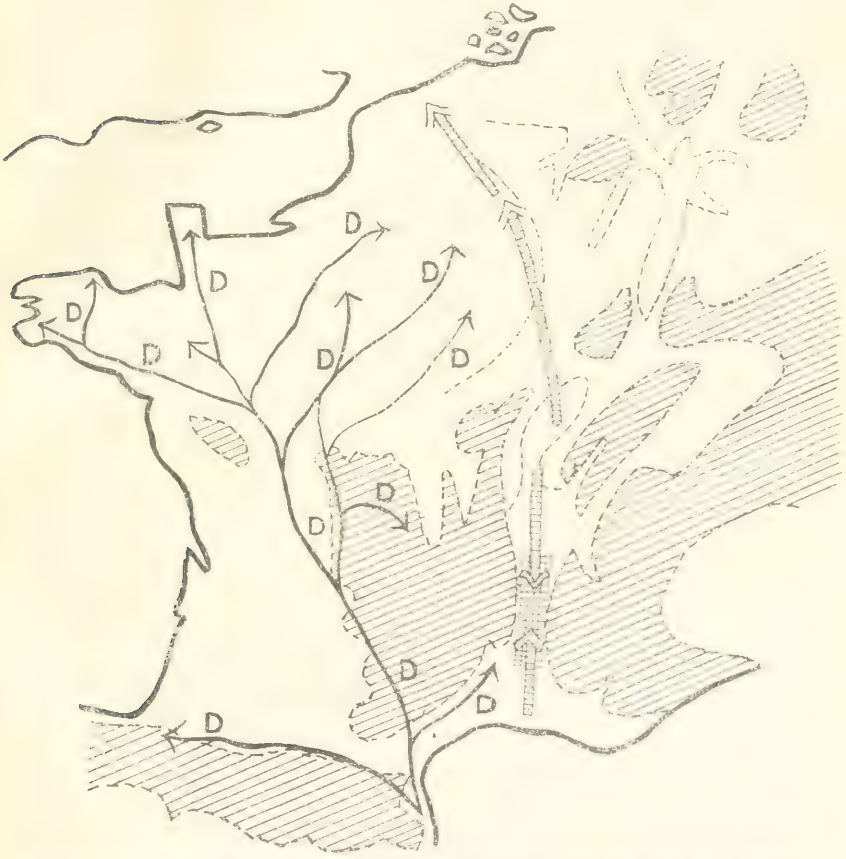

FIG. 3. The great ways across France. The masses of high land are lined as in Fig. 1. The old way from Narbonne to Cornouailles is marked by arrows and the letter D. The way which superseded it is marked by double arrows, and an area of forest which appears to have barred the way in earlier times is cross-hatched.

dark days after Rome's fall, but it soon sends on again to the north the Mediterranean ideal of the City of God, and, as that sacred oriflamme is carried forth by the Benedictines, the heirs of Rome's civilisation, the land rises from her ashes and puts upon her a white robe of churches. In the south the written law remains in use (Fig. 4): in the north the monks become more and more the interpreters and arbiters for the

people, who thus, with better times, naturally set about building cities round about the markets which grow under the protection of the Church. We thus have the contrast between the cities gathered around the municipal institutions and those nestling under the cathedral. The former are characteristic of the fully Romanised region, the latter of the Paris basin. The contrast is fairly similar between the Pays de langue d'oc and the Pays de langue d'oil.

At first the churches are built with round arches under influence of the Roman fashion, and these round arches remain highly characteristic in the Rhone valley and in Aquitaine, while the energetic Normans get hold of the idea and give it a splendid development in the enthusiasm of their new contact with the majestic tradition of Gaul. Then, as we know, the Paris basin develops the pointed arch, and the Gothic period begins: the state of feeling is such that pilgrims come even from Normandy to build Notre Dame de Chartres. The Paris basin has risen from the dust quickly enough to receive the inspiration of the Benedictines from the Mediterranean while it is still fresh.

It is also able to seize upon and adapt to the new circumstances the remains of the old civilisation of the west. We have Chrétien de Troyes and his work, and, far more important, we have the cult of the Virgin and the rise of chivalry, here as elsewhere to be associated with the resurgence of the mother goddess of the Bronze Age or Mycenean matriarchate.

To the fusion of these elements it adds some things of its own; the Gothic style spreads through it and beyond (Fig. 4). Its extension outside the basin is chiefly along the main roads, *e.g.*, past Limoges to Bordeaux and Bayonne, along the edge of the central plateau to Carcassonne and Narbonne (*i.e.* back to the Roman lands), by Metz to Strasbourg and beyond, and by the gate of Flanders to evolve the glories of Ypres and Bruges and Ghent, of Antwerp, Brussels, and Louvain, and even the borrowed glory of Cologne. It spreads through Canterbury, Winchester, and St. Andrews, all over Britain. But, save along these great roads, the Gothic is not often pure or complete outside the Paris basin. Dijon has Gothic work nearly all touched with classical feeling; Albi and other southern churches are in like case.

As regards Dijon, the fact that it is such a critical junction of roads from Rhone to Seine, from central Europe to Paris, from the south to the Rhine, and to the Meuse and Scheldt, made it a centre of expression, with free sculpture for example developing a century before Michael Angelo. Beaune, not far off, makes a useful contrast, for it is more essentially local, and it supplements the old capital city in many points of expression.

The churches of Aquitaine (Fig. 4) are a good illustration of its mixed character, for besides the Romanesque so magnificently demonstrated at Toulouse and Angoulême, the Gothic at Bordeaux and Bayonne and Carcassonne, and the beautiful mixed style of the church at Albi, there are the churches of Cahors and Perigueux. Of them it seems safe to say that with their cupolas they speak of Moorish-Venetian influences coming along the age-old coasting route around the Iberian peninsula.

It is not without interest that one notes the existence of what looks like a dolmen, at Confolens near the borders of Aquitaine, with the capstone

FIG. 4. Tentative Map of certain architectural distributions in France. Where the architecture in a city or abbey centre indicates the normal evolution from earlier Romanesque to later Gothic, or where there is Gothic work of importance the place is marked by a +.

Where the Romanesque style remained dominant the place is marked by a ○. Where, in spite of the advent of Gothic, the Romanesque buildings remained very important, as at Caen, Reims, Toulouse, etc., the two marks are set side by side.

M indicates a church of mixed style. In several cases it would be Romanesque or Classical in general but Gothic in detail. In the cases of Cahors and Perigueux there is a Moorish-Venetian element in the buildings.

supported on twelfth-century capitals, *i.e.* it dates seemingly from the revival of folk-life and tradition in Aquitaine, which is probably rich in the Bronze Age traditions for reasons already worked out. The long

persistence of feudal parochialism under shadowy mediæval English tutelage is another of the complications of Aquitaine, and a re-examination of the peculiar features of Correze would be profitable now we know the prehistoric connections as well as those of the Middle Ages with England. The very long-established arts and crafts of Limoges also need a new study of their origins. But Aquitaine is off the main line, and we must deal with Paris and the Rhone.

The mediæval inspiration, in spite of all it meant for citizenship and the crafts, had to cope with a fatal heritage of violence from the dark ages: and the military fears and consequent needs of the Paris basin too soon changed the inspiration into cold dogma, and then we notice a characteristic reaction. The south becomes critical, it thinks in new directions, probably not unconnected with the Bronze Age tradition we have discussed. With its habit of discussion and criticism it goes into the Albigensian heresy, all except Provence, which is too busy with literary and æsthetic expression to join in such a movement (Fig. 6).

The mediæval universities show interesting relations to some of the above-mentioned distributions (Fig. 5). The southern ones, following Bologna, are groups of students who employ teachers, and this type is so interesting that it spreads up to Orleans. But the mother of northern universities is La Sorbonne, a group of masters gathering students around them. Toulouse, however, is partly of the northern type, and was mainly founded from Paris in order to extirpate the Albigensian heresy when the Parisian militarism had done its awful work.

Thus we get the contrast between south and north clearly expressed in the Middle Ages, with Aquitaine and Burgundy as go-betweens, Aquitaine contributing something from the old life of the west and Burgundy something from that of central Europe. It is even probable that in some respects differentia accumulated between south and north in this period, though Paris and its militarism, a stern necessity because of the gates open to the barbarians from over Rhine, spread a somewhat mechanised rule more and more over the Roman south. The florescence of taste in the Renaissance Châteaux of the Loire basin is a notable expression of the unity around Paris which France gained after the mediæval defeat of England.

The seaward fringe of the Paris basin must not be forgotten even in a rapid survey. Normandy has already been touched upon as regards its energic assimilation of Gallo-Roman life, and its work is well known in history, so we need not go into detail. The west of Normandy, Le Cotentin, with its heaths, long remained akin to Brittany: it is a Celtic land with a Norman covering.

Brittany has been curiously distinct all through historic time. It was a great centre in the Bronze Age, and the Mycenean Celtic civilisation doubtless expressed itself there as elsewhere in the Celtic fringe. The Romans left these lands of the old civilisations alone for a while, and never made them truly Roman. Brittany received accessions of the Celtic elements from our islands, probably before and after the Romans, and it remains distinct for centuries, contributing its tradition to help the development of the literary expression of the Paris basin, retaining

as much as possible of its Celtic Christianity and its more ancient religions

Fig. 5. Map indicating—

(*a*) Pays du droit écrit, where Roman law survived the Dark Ages, to the south of line marked —|—|—|—|—|—|.

(*b*) Lands outside the boundary marked . . . were still treated as Pays étrangers in the Customs arrangements in 1788.

(*c*) The mediæval universities. S indicates a student democracy of the Bolognese type. P indicates a master university of the Paris type, though the students may have had much power. The University of Toulouse was founded largely in order to stamp out the Albigensian heresy.

under a Roman cover, and actually remaining distinct from the crown of France till the end of the Middle Ages.

The separateness of Brittany is becoming fairly appreciated, but the

contributions of the far west to European life are hardly yet known. We ought to realise that Notre Dame de Chartres owes a great deal of its unique hold on mankind to a prehistoric tradition of sanctity, of dedication to a Virgin who should bear a son, probably to the Mother Goddess of the Bronze Age, for it is on a dolmen route branching from that which ran from Narbonne across France to the Loire and Brittany, and it has a prehistoric rock temple beneath the Cathedral (see Fig. 3).

In spite of all the efforts of Paris and of Rome, Brittany has held on to its own ancient life in a way that not even Ireland can emulate, but it has none the less been almost as important to France as the Celtic fringe has been to England. In the British Isles it is the Celtic fringe, Ireland and Scotland foremost, then Wales, that is the mainstay of the army. It is the Celtic fringe, this time mainly perhaps Devon, Wales, and the Clyde, that is the home of the British navy. In France Brittany is the pillar of the navy, and the Breton sailors are unsurpassed in the world; the Breton soldier likewise does his very large share for the army of *la belle France*. When we remember, too, that the historic club of the Jacobins in Paris began as the Breton Club, and so in a sense started the great Revolution, we realise that Brittany is no mere poor relation of France—she has done mighty works, and will do them again.

With that we must leave the coastal fringe and concentrate on the main problem again. It has been said that Rabelais laughed the decrepit Middle Ages into their grave, and it is not without significance that his genius blossomed out when he got into the Rhone valley, the pathway of enthusiasms at one period, of criticisms at another. That the Rhone Valley helped the Renaissance Pariswards is obvious enough, but it is most interesting to notice that the part of the old Roman region down south which took to theological and categorical criticism was fairly accurately the district which had developed its criticism as the Albigensian heresy centuries before (Fig. 6). This time it was a philosophical criticism, it was the brave effort to work out logically the consequences of a belief in the omnipotence of God, without shirking the issues as all other Christians have done. It is the Huguenot country, as we see from the cities of refuge for the Huguenots proclaimed in 1621. Again, as in Albigensian times, Provence has neither part nor lot in the matter; there was no need for the cities of refuge in that country where criticism finds other means of expression for itself, thanks probably to its longer soaking in Graeco-Roman civilisation.

We hardly realise what the Huguenots have done in the world with their ruthless energy. Lutheranism in north Germany decayed in the anarchy of the Thirty Years' War, and then the Hohenzollerns, to their honour be it said, brought Huguenots from France and also men from Holland to build canals and link the wreckage of the Middle Ages on the northern plain into their new state of Prussia. Huguenots are also at the back of the life of many of the industrial communities of Britain, though many of them have forsaken Calvin for Servetus, *i.e.* have become Unitarians. Their influence on English thought is everywhere: of their influence in North America also much might be said. Paris dis-

persed the Huguenots: it had no room for dissident groups in its state, and they had no room for Catholics either. France gained unity, but at

FIG. 6. Tentative Map of distributions of certain religious movements.

The regions under the Counts of Toulouse affected by the Albigensian movement are enclosed in a line —·—·— The mountain regions to the east of that line were affected by allied movements.

The cities of refuge proclaimed for the Huguenots in 1621 are marked by circles, and it will be seen that a large number, including most of the great ones, are in or near the old Albigensian area. In both cases the real Provence appears to be little affected, and would be seen to have been less still if the map were drawn more accurately on a larger scale.

a tremendous cost of driving power, and she laid up much enmity for herself in Prussia.

In the great Revolution the Paris basin, especially Paris, sees that, in clinging to the semblance of its ever-desired unity, it has let France

decay into a ruin of fragments, left from the Middle Ages and unadapted to the new time. It sweeps away the *Ancien Régime* and characteristically tries to start afresh, this time with Reason for its guide, to a unity which must thus be a mechanical one. The Rhone corridor equally characteristically dissents, it has no love of the *Tabula rasa*, it is trained in the idea of continuity, it wants to express itself in its own way, not to accept a new and harder mechanical unity in place of the decayed old one, which it joined Paris in upsetting. It offers federation, but the military needs of Paris call for unity. So the Rhone corridor becomes Royalist, and this is true almost to our day of some Huguenots, strange as it may seem; it is a land of continuity, built upon gradual moderated changes through free criticism. So the struggle goes on, and it is keen enough even in this war time, but be it said for Paris that at its worst its mechanism is not a thing of horror like that of Berlin. Also, it is much fuller and richer in the better things of life than is the mechanism of London operating in Ireland, for example. Paris has needed to seek unity, but it is a unity, a co-ordination of the most complex contributions to life and thought, contributions of ideals and criticisms from the Rhone corridor, of languages perhaps from central Europe as well as the Rhone, of physical vigour and martial dash from the Rhine and the northern plain, of enterprise from the Norman estuaries, of daring seamanship, literary tradition and reverence from far Brittany, of good wine and much else that makes glad the heart of man from Aquitaine. The three recognised races of Europe and other groups that are attaining the distinction of separate race-names all jostle one another in this basin, so that it is a place of conflicting mentalities, of sharp mutual criticism, of the laughter that kills. Bergson's suggestive essay on Laughter becomes more intelligible when we realise that the subject is French laughter. He defines the laughable as, "*Du Mécanique plaqué sur du Vivant.*" May we adjust that a little and suggest that it is a bit from one type of mentality pitchforked into a sequence to which it does not belong, *i.e.* that it is often a contribution, ultimately, from one race or one stock in a setting belonging to another stock, a misfit, that is, which is to be laughed out of existence?

We thus see that the Paris basin has its work cut out to assimilate completely its own varied elements; its efforts on the other regions of France are only outwardly, and then only partially, successful.

In spite of improvement of communications, for the magnificence and costliness of the great highways was a subject of general complaint by most localities in the famous Cahiers of 1789, Paris looked upon eastern Burgundy, the southern Rhone, Aquitaine, and Brittany as "foreign lands" for customs purposes (Fig. 5). We have seen something of their claims to a life of their own.

It may perhaps be said with justice that the third Republic with its regionalising of universities has made a useful attempt towards the combination of political unity with local diversity. It is an interesting attempt, for the university, on the one hand, is the exponent of the general tradition of Europe to its region, and, on the other, the student of its own regional tradition, which it expresses and expounds to Europe

in general. The attempt has not yet been followed up politically, but those who are interested in studying French state affairs will probably see interesting changes in this direction. The mechanism of departmental administration is becoming obsolete and perilously expensive to run, and the regions of France will all need to develop their powers to the utmost after this devastating war. Laws have been drafted for discussion reconstituting the natural regions for governmental purposes, and an active development policy is likely to follow. Our British Development Fund is a useful precedent in this direction, but in France, still more if possible than among ourselves, its application would need to be regionalised to produce the best results. Here one may interpose that in government and in finance, among other things, the British Isles have certainly contributed much to French life, in addition to the rich contributions one surmises must have come from ancient Ireland; but that subject is not treated here, for reasons of brevity.

Summing up this too rapid sketch, we have seen that it has been the opportunity of France to serve as a Way of Light age after age. The Celtic-Mycenean civilisation of the Bronze Age touches its western shores with a fringe of Arthurian romance and leaves here, as elsewhere along its great route from Egypt and the Aegean to Iceland, contributions to literature and craftsmanship, tradition and religion.

The Roman life and the Roman law penetrate it everywhere and thoroughly assimilate the south to themselves, while they at least convert the north to reverence. The ideal of the City of God, which made the Middle Ages, comes up the Rhone corridor to transfigure the Paris basin, whence spread the Benedictine ideal, the cathedral, the cult of the Virgin, the romances of Brittany, the renewed veneration for Rome far and wide beyond its borders, and especially to Britain. The Huguenot influence spreads to mould our modern life in many lands, the French Revolution changes even the depth of our souls, and the France of to-day is at her old work of helping her fellow-citizens of Europe towards the ideal.

It is an ideal in which European civilisation shall range far and free, in which at least the necessary political and administrative unity shall be secured without endangering the natural folk character of the varying regions, for this is the chief source of inspiration. The way towards the ideal is always hard, but France gives us at least some grounds for hope.

We have followed the inevitable and continuous efforts of the Paris basin towards the synthesis of all the varied racial and traditional elements that have crowded in through its many gates, and we have seen that these efforts have attained more than a little success, thanks to the favouring circumstances of the region. It has thence been possible in France, as nowhere else, for real continuity from the Middle Ages to persist to our own times, with all that this means in agricultural welfare and steadiness. The lands of France are probably better cultivated in this war time than ours ever are, save in East Anglia. We have seen, too, that it is the region most naturally and most easily in contact with the Mediterranean with its age-long wealth of civilisation ever renewing itself.

So much for the argument from position. We may also take courage from the fact that, ever since she rid herself of the great imperial incubus in 1870, France has been doing great things for the world. She has had a great share in the engineering of the canal, of the modern aeroplane and submarine, motor car and locomotive. She is the pioneer of humane geography, her medical chemistry has transformed modern hygiene. She has faced her internal problems with a fine courage, she has drunk her cup always to the dregs, she has not flinched at the spiritual problem of decay of faith in dogmas, she has created a literature that has inspired most others, she has tamed the wild in North Africa, and has founded a dominion where European and African become one, and finally the solid endurance so characteristic of her peasantry has achieved the great triumph of Verdun. Her government has stood the strain of the war at least as well as any other, and will emerge, one dares to hope, without a fear lest unity should be endangered. If, therefore, for the first time, Paris's historic fear should be removed because the barbarian menace is reduced, what may we not expect from the liberation of energy and enthusiasm that will follow? Will it not let the visions come up again out of the south to brighten our cloudier north?

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

THE Session will be opened on November 9 in Edinburgh by the delivery of an address by Mr. Douglas W. Freshfield, D.C.L., President of the Royal Geographical Society, who will speak on "The Caucasus Mountains." At this meeting the Livingstone Medal will be presented to Mr. Freshfield, who will repeat his lecture at Glasgow on November 10. Mr. H. C. Woods will open the Session at Aberdeen and Dundee on November 7 and November 8 respectively, by the delivery of a lecture on "The Salonika Campaign."

OBITUARY.

JAMES BURGESS, C.I.E., LL.D.

1832—1916.

THE Scottish Geographical Society has lost a staunch supporter and a much valued counsellor by the death of Dr. Burgess on October 3rd. He was an original member of the Society, and for over twenty years, until his last illness, was one of its most active members of Council, unfailing in his attendance at all committee meetings, and unsparing of his time and assistance whenever there was special work to be done. For many years he acted as Honorary Librarian, and he also rendered invaluable service on the Scottish Place-Names Committee. He was made a Vice-President in 1915.

Dr. Burgess was born at Kirkmahoe, in Dumfriesshire, in 1832, and educated at the Normal School and University in Glasgow. In 1856 he

went out to India, where he was engaged in educational work in Calcutta, and subsequently in Bombay. From 1868 to 1873 he was Secretary of the Bombay Geographical Society, and did important work in connection with the *Bombay Gazetteer* and the English transliteration of Indian Place-names. In 1873 he became head of the Archæological Survey of Western India and of Southern India in 1881. The rock temples of Elephanta and the Jain temples of Kathiawar were among the special objects of his investigations at this period. From 1886 to 1889 he was Director-General of Archæological Surveys in India. In 1890 he retired from the Indian Service and settled down in Edinburgh, where his subsequent energies were devoted to the completion and editing of his archæological researches. These results fill many imposing volumes, and form a lasting monument to his memory, but an adequate appreciation of that work is beyond our scope, and must be left to students of Indian archæology.

It was in these later years in Edinburgh that he devoted himself to the interests of the Geographical Society. He also served on the Council of the Royal Society of Edinburgh, and was Chairman of the University Library Committee. In 1880 he received the honorary degree of LL.D. from the University of Edinburgh, and in 1885 he was made a Companion of the Indian Empire. In 1898 the Royal Society of Edinburgh awarded him the Keith Medal for his mathematical researches.

After a long and distinguished record of scientific and historic research he passed away in his eighty-fifth year. The wide scope of his mental energies and his indefatigable industry were alike remarkable, but whilst eminent as a scholar, he was no less esteemed for his public spirit and unselfishness. J. G. B.

GEOGRAPHICAL NOTES.

America.

Expedition to Equatorial South America.—Dr. Hamilton Rice, the well-known American explorer, is about to start on a new expedition to the Amazon region. On his last expedition he made his way to the interior from the Pacific coast. This time he proposes to enter from the opposite side, and make his way by the Amazon and Rio Negro to Santa Isabel. From there he will proceed by steam launch to the river Guainia, which he hopes to trace to its source, using a specially constructed steam launch as far as possible, and afterwards canoes. Apart from his exploration of the Guainia, Dr. Rice hopes to survey and map that curious waterway, the Casiquiari, which has connection with both the Amazon and Orinoco basins. In the latter river system Dr. Rice hopes to determine the relative size of the two main branches of the upper Orinoco, and investigate other hydrographical problems of the region.

Land Relief and Settlement in Mexico.—Mr. Leon Dominian recently read at Washington a paper, briefly summarised in *Science* of June 9

on "Some Aspects of the Land as a Factor in Mexican History." In this paper he points out that the relief of Mexico is such as to permit of certain easy lines of access to the plateau region. The line of advance of the Mexicans in the course of their early migrations, the routes followed by the white man in modern times, and railway penetration, have all been determined by these natural routes. Settlement has taken place mainly on the plateau and above the 4000-foot contour, because of the fact that this region constitutes the only favourable human habitat within Mexican territory. Again, the want of political union which was found by Cortes, and has been characteristic of Mexico throughout its history, finds a physical explanation in the difficulties of communication. Navigable rivers do not occur, and the mountainous and intermontane regions are characterised by a succession of narrow valleys, each practically walled up from the others by intervening ridges over which travel is arduous. Once again, the Mexican system of land tenure is connected with the occurrence of large arid areas. Mr. Dominian regards the country as a transitional region, both from the standpoint of physiography and of human relations. On the one hand the physical features of the North American continent are prolonged into Mexico, to end in the vicinity of the Isthmus of Tehuantepec; while, on the other, the population links together Anglo-Saxon and Latin America.

Polar.

Sir Ernest Shackleton's Expedition.—The rescued members of the Weddell Sea party of this expedition are now on their way home, but Sir Ernest Shackleton has gone *via* Valparaiso and Panama to San Francisco. Thence he proposes to go to Australia, where he hopes to arrive at the end of November. His intention is to supervise personally the rescue of the Ross Sea party. The rescue ship, the *Aurora*, is to sail for the Antarctic from New Zealand on December 15 under the command of Capt. Davies.

General.

The Plant and the Soil.—Dr. E. J. Russell recently delivered before the Royal Institution two lectures on this subject, whose contents are summarised in an article in *Nature* for June 15. Though the outlook in this article is primarily agricultural, the subject has considerable geographical bearing, and a brief summary may be found useful. The first point stressed is that it is only the soil and not the subsoil which is well suited for plant growth, and thus for man's purposes in agriculture. But soil when first formed has the characters of the subsoil, and the difference between the two is that in the soil there occur the residues of generations of plants which have lived and died there. As these plant residues decay their nitrogen appears in the form of nitrate. The processes of decay are due to a great number of organisms, whose function may be summarised as being to prepare from the dead plants of earlier generations food material to supply a new growth. But these beneficial organisms are not the only inhabitants of the soil. There are others, probably amœbæ, though other forms may also be involved, whose activities tend to keep down the number of the

beneficial organisms. These detrimental organisms seem to be on the whole more sensitive to unfavourable conditions than the beneficial ones, thus such conditions as long frost, drought, heat, and so on, favour the latter at the expense of the former, while prolonged warmth, moisture, or excess of food in the form of organic manures tend to diminish the number of the nitrate-forming organisms, so that the soil becomes infertile or "sick." In the special conditions which occur in glass-houses, the soil can be "sterilised" by the use of steam, which checks the multiplication of the detrimental organisms, but no method has been devised of doing this in the field. Though Dr. Russell does not mention the point, it is obvious that the facts he sets forth afford a possible explanation of the relative infertility of some tropical soils. It is a geographical commonplace that the world is chiefly fed from temperate regions, and that tropical agriculture in *e.g.* many parts of Africa, is often somewhat unproductive. It may be that the search for some means of checking the growth of the detrimental soil organisms on the large scale for the sake of temperate agriculture, will lead in the future to a discovery which might revolutionise agriculture in the tropics by enabling full use to be made of the favouring conditions in regard to temperature and moisture often to be found there, conditions which at present seem in many places to be neutralised by some factor limiting the growth of useful plants.

Dr. Russell discusses briefly the interesting question of how far man may hope to control the soil factors which limit plant growth. Lack of lime, excessive wetness, drought, poverty, and so on, can all in many cases be dealt with, directly or indirectly, but shallowness of soil, weather conditions, and soil type are beyond man's control, and the conclusion is that, at least with present methods, large tracts of land must remain useless from the agricultural standpoint.

The Use of the Terms Palæolithic and Neolithic.—In a paper read before the Manchester Library and Philosophical Society, Professor G. Elliot Smith pointed out that Lord Avebury's terms, Palæolithic and Neolithic, as applied to early man are to some extent misleading. As is well known, Lord Avebury, then Sir John Lubbock, distinguished by these terms between the crude implements of the early Stone Age and the polished ones of the later. But recent investigation has tended to show that the men of the Upper Palæolithic period show in skill and craftsmanship a much closer affinity to those of the Neolithic Age than to Lower Palæolithic man. It is now generally believed that after the disappearance of Neandertal man at the end of the Mousterian period, the new race of men which supplanted him in Europe and introduced the Aurignacian type of culture, conforms in all essential respects to the existing *Homo sapiens*. Professor Smith would thus differentiate between a Palæanthropic age, when Europe was inhabited by types of mankind belonging to divergent species, or perhaps genera, who have left their remains near Piltdown, at Heidelberg, and in the various Mousterian stations, and a Neoanthropic age, when men of modern type, with higher skill and definite powers of artistic expression, supplanted their predecessors. Professor Smith believes that the continued use of the terms

Palæolithic and Neolithic tends to obscure these well-recognised facts, and considers that they should be replaced by some such terms as these suggested.

Commercial Geography.

New Marseilles-Rhone Canal.—Professor Piero Gribaudi devotes an article in the *Bollettino della Reale Società Geographica Italiana* for July last to the remarkable canal between Marseilles and the Rhone at Arles at present under construction. The canal is carried through the hills north of Marseilles by the Rove tunnel, which is four and a half miles long and seventy-two feet wide, with a depth of ten feet of water, and was inaugurated in May last by the Minister of Public Works. The canal will make direct barge traffic possible between Marseilles and the river. The communications of Marseilles have also been improved by the construction of a new line of railway from the city to Miramas on the Paris-Mediterranean line. This line runs westward from Marseilles along the coast, and is an alternative to the long Nerthe tunnel, which might be easily blocked by an accident, and was thus a danger to free railway communication between Marseilles and the interior.

The canal is also discussed by Professor Paul Masson in a long communication to the *Annales de Géographie* for May 15. In this article Professor Masson gives first a short historical sketch of the attempts made since the seventeenth century to improve communication between the Rhone and Marseilles, and then a very detailed account of the inception and execution of the present project, which dates from the year 1906. Since the outbreak of war the obtaining of the necessary labour has been a great difficulty, though this has been partly got over by the extensive use of machinery. Though the canal is not yet completed, the most difficult part of the work has been accomplished, and what remains can be done rapidly. Professor Masson states that there has been active controversy as to the probable direct utility of the waterway, many persons believing that the seaway from Saint Louis to Marseilles will continue to be preferred to the canal. On the other hand, it seems clear that its indirect utility, in affording along its banks sites for factories which can obtain coal and raw material cheaply by water, and enjoy the advantage of cheaper labour and land than are available within the city, will be enormous. Professor Masson sums up by saying—"The Rove tunnel has broken through the encircling hills which theatened to check the commercial and industrial expansion of the great Mediterranean port."

EDUCATIONAL.

Gilchrist Studentship in Geography.—We are informed that the Gilchrist Educational Trust will proceed, in February next, to the election of a candidate for the Studentship in Geography. The studentship is of the value of £80, and has been founded for the improvement of the teaching of geography, by giving to the teacher who seems best fitted to make use of it, an opportunity of further geographical study. Applications should be sent to Professor L. W. Lyde, University of

London, University College, Gower St., London, W.C., before January 25, 1917.

NEW BOOKS.

EUROPE.

Highways and Byways in Galloway and Carrick. By the Rev. C. H. Dick. With Illustrations by Hugh Thomson. London: Macmillan and Co., Limited, 1916. *Price* 6s. *net.*

Mr. Dick points out in his preface that the area discussed in this volume of the *Highways and Byways* series has remained unknown to the general public longer than any other part of the mainland of Scotland, and this in spite of the fact that it has numerous literary, romantic, and historical associations. To Mr. S. R. Crockett's tales and romances much of the credit for the recent increased interest in Galloway must be given. Mr. Dick in his volume avails himself to the full of all the associations of the neighbourhood. The reader is introduced to the churchyard in which lies the body of Helen Walker, the prototype of Jeannie Deans, and where also there is a gravestone erected by Sir Walter Scott, with an epitaph written by him. Very minute directions are given for the finding of Dick Hatteraick's cave, though it is disappointing to learn that when reached it fails in almost every respect to correspond to the description in *Guy Mannering*. We have also ghost stories, tales of the Covenanters, of murders and sudden deaths galore, while Mr. Hugh Thomson's sketches give charming representations of the natural beauties, some of the moorland pictures being especially attractive. There is a map, but we miss a general chapter giving an outline of the geography of the region.

Serbia in Light and Darkness. By the Rev. Father Nicholai Velimirovic. With Preface by the Archbishop of Canterbury. With 25 Illustrations. London: Longmans, Green and Co., 1916. *Price* 3s. 6d.

This is a pathetic little book, based upon a series of lectures given by Father Velimirovic to various audiences in this country, to which are added "Fragments of Serbian Wisdom" and "Fragments of Serbian Popular Poetry." The lectures contain brief sketches of Serbian history, up to the present time, and accounts of the habits and customs of the people, and the book is copiously illustrated, some of the photographs being very fine. Of most geographical interest perhaps are the descriptions of the significance of the villages in Serbian life, and of the meaning of Macedonia to the Serbs. As regards the first point the author emphasises that Serbian democracy arose in the villages and was not, as in the West, a product of town life. In regard to Macedonia we quote the following eloquent passage: "All Serbia's fighting and suffering have been because of Macedonia. She fought against the Turks because of Macedonia. She fought against the Bulgars because of Macedonia. And she is now losing her independence because of Macedonia. Because she could not give up Macedonia, which means her glory, her history, her poetry, her soul, she is now trodden down and killed. Serbia could not live without Macedonia. Serbia did what she could—she died for Macedonia. And if one day, God willing, from this blessed island should sound the trumpet for the Resurrection for all the dead, killed of the German sword, I hope Serbia will rise from her grave together with Macedonia, as one body and one soul."

As giving both some idea of the place which free Serbia occupied in the world, and of the tragedy of her fate, the book can be cordially recommended.

ASIA.

My Siberian Year. By M. A. Czaplicka, F.R.A.I., F.R.G.S. London: Mills and Boon, 1916. *Price* 10*s.* 6*d. net.*

Siberia is a country vast enough to present countless aspects, and Miss Czaplicka tells us that "to get an adequate idea of the variety of Siberian climate, landscape and ethnology, one should travel in the direction of the meridians." It was in that direction that most of her exploring work was done—from Krasnoyarsk down the Yenisei to Golchikha at its mouth, and from the same place up the Yenisei to the latitude of Minusinsk, accordingly over a range of latitude reaching further north than the northernmost point of Europe and as far south as Edmonton, the northernmost of the inland towns of Canada. It was as a research student of the Oxford School of Anthropology that Miss Czaplicka came to spend her year in Siberia, and that explains the nature of the bulk of the contents of this volume as well as the direction of her journeys, which included a wide loop to the east and north-east of Turukhansk. Most of the chapters are devoted to giving an account of the mode of life, customs, and beliefs of the natives of northern Siberia among whom most of her time was spent, together with the scenery that forms the background of their life. Fascinated herself both by the country and its people Miss Czaplicka succeeds admirably in conveying a sense of that fascination to her readers. Like other travellers in the far north, she cannot refrain from expressing her surprise at the extraordinary beauty of the scenes sometimes presented there, in summer "the tundra bathed in the pink glory of the low sun," rising about one o'clock, only a short time after the twilight of the previous evening, and in winter now and again times when the strange unearthly beauty of the tundra "drowns you in an ecstatic contemplation that quite blots out your aching sense of the terrible cold." One chapter is devoted to what the author calls the riddle of the southern Yenisei, the evidences in the Minusinsk district "of an early Siberian civilisation drowned under the Tartar and Cossack floods" presenting a variety of problems, to the solution of which there is as yet no clue (pp. 227-9).

But Miss Czaplicka is not only interested in ethnological matters. She gives us also an interesting sketch of the history of the relations between the Russians and Siberia, both in the days before and in those subsequent to the expedition of Yermak (1582). Most of her readers will probably learn first from her that as far back as the fourteenth century the Kara Sea route to northern Siberia, which is only now being vigorously revived, was open to trade, and not merely that, but was used as a road for colonists, and that it was only after the Moscow government closed this route, that the chief settlement, Mangazei, began to decline and was finally taken and burnt by the Ostyak (p. 277). An instructive account is given of the Sibiriaks or Russian settlers of Siberia, who like to call themselves the Canadians of the Old World (p. 256), and who since the introduction of railways have been sharing in a development not unlike that of Canada. In 1905, we learn, over 273,000 tons of corn were transported over the new railway to Europe, and by 1908 this quantity was more than trebled (p. 295). Now, as is well known, this export is far exceeded in value at least by that of butter.

The Minusinsk district, an exceptionally fertile area, where, even before the time of the Russian occupation, native agriculture had reached a quite high stage of development (p. 286), is now being connected by rail with Achinsk (p. 305) on the main line to the west of Krasnoyarsk, and the completion of this railway will no doubt add considerably to this trade. Manufactures are springing up, and mining, not merely for gold, but for coal and iron, is increasing. But there are discouraging as well as hopeful results of the introduction of railways to be noted.

"Since the opening of the Trans-Siberian Railway . . . there are often to be seen whole caravans of *novosioly* new settlers), destitute and infirm, drifting from place to place, without permanent homes or belongings, getting odd jobs from the traders or *starojily* (old settlers, who give them bread on credit, until finally the survivors drift back to their old homes in Russia" (p. 254). The Sibiriaks generally, Miss Czaplicka observes, have not yet reaped an adequate share of the increased commercial prosperity of their country, but they confidently expect many reforms in the near future. The volume is provided with an index, a glossary, a sketch-map showing the author's route, and numerous illustrations mostly from photographs, but some reproduced from drawings which originally appeared in one or other of the Russian supplements of *The Times*.

India and its Faiths: a Traveller's Record. By James Bissett Pratt, Ph.D., Professor of Philosophy in Williams College. London: Constable and Co., Limited, 1916. *Price* 12*s.* 6*d. net.*

This is very far from being a mere globe-trotter's book even although Professor Bissett Pratt was only a visitor in India for less than a year. He travelled in India "during the autumn, winter, and spring of 1913-14." As the author of *The Psychology of Religious Belief*, and a professed student of philosophy, Professor Bissett Pratt was particularly well qualified both to interpret what he saw at first hand of the faiths of India and to utilise what others had previously written regarding them. Nevertheless, the feeling remains with the reader that this bulky volume of 482 closely printed pages can hardly be ranked as expert testimony or authoritative pronouncement regarding "India and its Faiths." It ranks rather as a first-class college prize-essay or graduation thesis, even although the essayist in this case is a professor and not a student, except in the highest sense of that word. Moreover, Professor Bissett Pratt essays to present to us "Indian religious *life* as it is *to-day*," the very aspects of India's Faiths, to do justice to which wide and intimate familiarity is most needful, and second-hand information most difficult to assimilate. A visiting student almost inevitably surrenders himself to his guides for the time being, and instances are not wanting in which the professor presents us with views thus coloured, as also with interpretations of things as modernised or Christianised by himself. As an instance of the former, one might refer to his ready acceptance of the idea (p. 14), that a *ma*, *mata*, or mother-deity connotes tenderness to Hindus in general. To only a very small minority of modernised minds does any such goddess have such a significance, the fact being that the goddesses of India, not the gods, are the terrible deities, to be particularly feared and propitiated with blood. As an illustration of modern *a priori* rationalising of the "Indian religious life of to-day," what the professor says of Transmigration or Rebirth (p. 108, etc.), may be quoted. Transmigration, he tells us, means the "education" or "progress of the soul." This view no doubt fits into an academically constructed system of Hindu theology, but does it truly represent Indian belief? In reality does Transmigration, as a working theory of the soul, have *any* forward outlook? Is not its outlook exclusively backward? It is the explanation, ready to hand, of any otherwise inexplicable misfortune. The misfit of the "educational" interpretation is manifest inasmuch as the reborn soul is quite unconscious of the good or evil for which its present existence is reward or is punishment.

Hearty acknowledgment must be made of the judicial balance which the author maintains. Requiring sympathy as a first qualification in any would-be interpreter of Indian Faiths, he nevertheless disavows the misleading "ultra-sympathetic" pictures published of late years. Not sparing of his estimate of

certain features of our popular Western theology, nevertheless his verdict is unhesitating that Christianity proves itself easily the most fruitful in practical goodness of life and in motives thereto.

A valuable feature of the book consists of Professor Bissett Pratt's comparisons of Indian ideas and rites with what may be called their Western Christian analogues. One may not particularise.

In the Preface the reader is promised a number of illustrations, mostly from photographs taken by the author himself. But, for some reason unexplained, no illustrations appear.

AFRICA.

Thinking Black: Twenty-two Years without a Break in the Long Grass of Central Africa. By D. Crawford, F.R.G.S. Second Edition (24th Thousand). London: Morgan and Scott, Limited, 1914. Cheap edition. *Price* 3*s.* 6*d. net.*

This is a cheap re-issue of the second edition of a book which we reviewed here in some detail on its first appearance (cf. vol. xxix. pp. 215-16). It has the same illustrations as the original volume and is well and attractively got up.

AMERICA.

Travels in the American Colonies. Edited by Newton D. Mereness. New York: The Macmillan Company, 1916. *Price* 12*s.* 6*d. net.*

This volume, published under the auspices of the National Society of the Colonial Dames of America, consists of a number of journals giving the records of travels in different parts of North America, made between 1690 and 1783, reproduced verbatim or in translation, and accompanied by brief introductions, in which the editor states the circumstances in which each journey took place, as well as by notes as to the persons and places mentioned in the journals, and as to the meaning of certain archaic terms. Two of the longest and most interesting of these journals are that of Diron d'Artaguiette, Inspector-General of Louisiana, giving an account of a journey in 1722-23, and that of a British officer who travelled in America and the West Indies in 1764-65. In 1717 Louisiana, comprising the French possessions in the Mississippi valley, was granted to the Western Company, who intrusted the direction of affairs there to three commissioners, and d'Artaguiette's journal is a report to those commissioners on a tour of inspection from New Orleans up the Mississippi to the Illinois country. Among the points of interest mentioned on the occasion of this tour, one may note the fact that "French" wheat grew very well and of fine quality in the southern part of what is now the State of Illinois, where the inhabitants who cultivated it are described as "Canadians, French or discharged soldiers," who sold their wheat and other products to the Company for the subsistence of the troops (p. 70). We find, too, that at this time the lower part of the Ohio was known as the Wabash (Ouabache), and d'Artaguiette noticed, under date April 12, that "this river had all overflowed, and that it pushes back the Mississipy, which is very low," the phenomenon which without doubt explains the fact that no great town arose at this important river confluence, where one might have expected an American Allahabad, but where Cairo has only slowly struggled up to the moderate degree of importance which it now possesses.

The British officer, who travelled in America and the West Indies in 1764 and 1765, is identified on what seems to be quite satisfactory evidence with Lord

Adam Gordon, son of the second Duke of Gordon, at that time Colonel of the sixty-sixth regiment of foot, which was stationed in the West Indies. His journal is of even greater interest than that of d'Artaguiette. Lord Adam Gordon was a good observer, and carefully distinguishes between what he saw for himself and what he learnt from others. It is difficult to make a selection for a brief notice from among his observations, but it may be worth while to call attention to his association of agues with insects. "In general," he says, "what part of South Carolina is planted, is counted unhealthy, owing to the Rice-dams and Swamps, which, as they occasion a great quantity of Stagnated water in Summer, never fails to increase the Number of insects, and to produce fall fevers and Agues, dry gripes and other disorders" (p. 399). In various places he shows genuine geographical insight, and if he ventures at times on geographical grounds to make forecasts which have not been fulfilled, one must recognise that his anticipations were not without plausible reasons. If New-Bern in North Carolina has not become the place of note that he thought it might become, we must remember that in his day the existence and effects of railways could not be foreseen. If he thought that Philadelphia, which he describes as "one of the wonders of the world," must become the metropolis of America, that is only what there seemed good reason for thinking even at a considerably later date than that of the journey now referred to. One of the editor's notes raises a query. In an enumeration of the products of Madeira Lord Adam Gordon mentions Ananas (p. 374). The editor says in a note "bananas." But may not Ananas, that is, pine-apples, actually have been meant? The editor gives no note on the word "bitt," where Lord Adam Gordon speaks of pine-apples being sold near Kingston, Jamaica, at "a bitt apiece" (p. 481). Perhaps such a note was thought unnecessary for American readers, where the term bit as a denomination of value is still in use. The *New English Dictionary* states that in the last (that is, the eighteenth) century it was used in the southern states of the United States as a name for a real, that is, the eighth of a Mexican dollar, or about 6½d. The present reviewer has found the term in use in the Western States of America to denote that value at the present day. A quarter (dollar) is sometimes spoken of as "two bits."

GENERAL.

An Introductory Atlas of International Relations. By Henry Clay, M.A., and Arthur Greenwood, B.Sc. Maps by H. S. Hattin. London: Headley Brothers, 1916. *Price* 1*s.* 6*d. net.*

Since the settlement at the end of the present war will involve many ethnological questions, the publication of this political and ethnological atlas is very appropriate. By means of a series of forty-seven maps we have the whole area of the present war brought before us in a scientific manner, historical, ethnographic, and political, and can follow the rise and fall of States during the past centuries. We can understand how they have been put together utterly regardless of their ethnological relations, and we can speculate how far ethnology or nationality will be taken into account when Europe is rearranged, and a new map of Europe is reconstructed, at the close of the present war. Take Poland, for example. If that unhappy country is to be resurrected in its entirety, as Russia and Germany propose, it must be allowed, for historical and ethnological, as well as economic reasons, to possess its old seaport of Danzig. Map 9 of this atlas shows us Germany in 1648 with Poland in the proud possession of the whole course of the Vistula, including Danzig at its mouth. But if this territory were awarded to Poland, Prussia, a German Baltic province, would be cut in two. Such is one of the many

problems which will occur in looking over this very cheap and elaborately annotated atlas, which we commend to our readers.

BOOKS RECEIVED.

Big Game Shooting in Lower Burma. By SYDNEY A. CHRISTOPHER. Medium 8vo. Pp. iii + 372. *Price* 16*s.* Rangoon: Burma Pictorial Press, 1916.

Forty-five Years in China. Reminiscences by TIMOTHY RICHARD, D.D., Litt.D. With 18 illustrations. Demy 8vo. Pp. 384. *Price* 10*s.* 6*d. net.* London: T. Fisher Unwin, 1916.

The Archæology of the Holy Land. By P. S. P. HANDCOCK, M.A. With coloured frontispiece, 25 plates, 109 figures in text, and 2 folding plans. Medium 8vo. Pp. 384. *Price* 10*s.* 6*d. net.* London: T. Fisher Unwin, 1916.

Central Europe. By FRIEDRICH NAUMANN. With an Introduction by W. J. ASHLEY. Translated by CHRISTABEL M. MEREDITH. Demy 8vo. Pp. xix + 354. *Price* 7*s.* 6*d. net.* London: P. S. King and Co., 1916.

Political Frontiers and Boundary Making. By Col. SIR THOMAS H. HOLDICH, K.C.M.G., K.C.I.E., C.B., D.Sc. Demy 8vo. Pp. xi + 307. *Price* 10*s. net.* London: Macmillan and Co., 1916.

The Diary of Ananda Ranga Pillai. Translated from the Tamil by order of the Government of Madras. Edited by H. DODWELL, M.A. Vol. iv. Demy 8vo. Pp. xv + 505. *Price* 4*s.* 6*d.* Madras, 1916.

Canada: The Country of the Twentieth Century. By WATSON GRIFFIN. Published by authority of Sir GEORGE E. FOSTER, K.C.M.G., Minister of Trade and Commerce. Imperial 8vo. Pp. 283. Ottawa: Department of Trade and Commerce, 1915.

Denmark and Sweden with Iceland and Finland. By JON STEFANSSON. With an Introduction by LORD BRYCE, O.M. Demy 8vo. Pp. xxxii + 384. *Price* 5*s. net.* London: T. Fisher Unwin, 1916.

The German Road to the East. An Account of the "Drang nach Osten" and of Teutonic Aims in the Near and Middle East. By EVANS LEWIN. Demy 8vo. Pp. 340. *Price* 7*s.* 6*d. net.* London: Wm. Heinemann, 1916.

Glimpses of our National Parks. By ROBERT STERLING YARD. Pp. 48.

The Sequoia and General Grant National Parks. Pp. 48.

The Mesa Verde National Park. Pp. 46.

Forests of Crater Lake National Park. Pp. 37. Washington, 1916.

Geographical Distribution of Anthropological Types in Wales. By H. J. FLEURE and T. C. JAMES. Pp. 153. London: Royal Anthropological Institute of Great Britain and Ireland, 1916.

Administration Report of Bihar and Orissa during 1914-1915. Patna, 1916.

Report on the Administration of Bengal, 1914-1915. Calcutta, 1916.

Edinburgh University Calendar, 1916-1917. Edinburgh, 1916.

The Peace River Country: A compilation of all authentic information available as to the resources and possibilities of the basins of the Peace and Hay Rivers. Pp. 47. Department of the Interior, Canada, 1916.

Punjab District Gazetteers. Vol. xxx. Lahore, 1916.

Assam District Gazetteers. Vol. viii. Shillong, 1916.

Central Provinces District Gazetteer. Calcutta, 1915.

District Gazetteers of the United Provinces of Agra and Oudh. Allahabad, 1916.

Publishers forwarding books for review will greatly oblige by marking the price *in clear figures, especially in the case of foreign books.*

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

RIVER-FRONTIERS IN EUROPE.[1]

By Professor L. W. Lyde, M.A.

(With Sketch-Maps.)

At the recent meeting of the British Association in Newcastle, Sir Thomas Holdich, our greatest expert in frontier-demarcation, in a paper on "Political Boundaries,"[2] expressed some surprise that a more careful consideration had not been given long ago to the principles which should govern the delimiting of political boundaries, and which should themselves be based on such factors as are most efficient in the preservation of peace. The charm of much of his language, especially about mountains, and the characteristic courtesy with which he treated opponents, no doubt helped largely in making his position persuasive to his audience: but that position, as suggested by this surprise, was essentially military, and reminded one that much of his demarcation work had been done on ground which he had fought over in his early days. He was really criticising a political line from the point of view of a young captain of Engineers on very arduous, active service.

As a matter of fact, if war is more or less a normal state for man, and if a political frontier is really a military feature in disguise, then there is nothing surprising in the absence of a body of political principles to guide delimitation officers. But, if war is not a normal condition,—though a dangerous condition into which man occasionally is entrapped—then the surprising thing is that the accepted theory of frontiers is essentially—instead of only partially—a military one. One knows only too well how boundary disputes do stir up an almost incomprehensible

[1] The three sketch-maps which accompany this article are reproduced, with a slight change in Fig. 2, from Prof. Lyde's *Some Frontiers of To-Morrow: an Aspiration for Europe*. London: A. and C. Black, 1915.

[2] Cf. this *Magazine*, p. 497.

intensity of feeling *on the spot*; and that is an obvious reason for not leaving their settlement in the hands of the purely *local* authorities, although full regard must be paid to the representations made by such authorities. In the same way, though full regard should be paid to the representations of military authorities on a proposed frontier line, the line should be chosen by political authorities and without regard solely to the military bias.

This does not mean that we are to have recourse to reckless plebiscites, nor that any sane person believes that we are within sight of some great regeneration of humanity. But it does mean that the true principle of democracy is sufficiently mature to demand that boundaries between "nations" should make for peace as well as for security. The two things are far from being the same. No doubt, in the past the conditions of political life have left only a choice of evils; and the lesser evil was to choose a feature which would minimise causes and chances of friction by entirely preventing contact. Sir Thomas carries this principle to its logical conclusion in asserting that the absolute physical barrier of a great mountain system is "incomparably the best." That is to say, the essential object of statesmanship in the delimitation of a political frontier is not to effect an international equilibrium across it, but to make any international intercourse—peaceful or otherwise—impossible!

By "equilibrium" here, of course, one does not mean the complete equalising of the whole power of the opposing states, *e.g.* Belgium and Germany, so as to reduce them to a condition of mutual paralysis so far as hostilities are concerned; but even this desirable result might be reached in the case of states that were strictly comparable in size and strength, *e.g.* Belgium and Holland. Indeed, the relations of these two states illustrate admirably the essential point. For, in the light of history, one can only admit that it is rather typically Dutch—in "slimness" and shortsightedness—to refuse to dredge the *Maas* from Venlo to Visé sufficiently to allow the busy traffic on the *Meuse* above Visé direct access by the lower river to the ocean. But one may fairly claim that it is quite preposterous that a Dutch enclave on the Belgian bank of the Scheldt estuary should prevent the Belgians, in time of war, from succouring their own great harbour of Antwerp. Nor are the results confined to the river itself; for the presence of a German submarine base at Zeebrugge is the direct sequel to the presence of the Dutch enclave in Flanders. International "equilibrium" here demands the purchase[1] by the Allies, as a gift to Belgium, of this Dutch enclave, so that the international frontier might be moved to the fairway of the estuary. Similar considerations, of course, demand the restoration to Holland of the territory over which Germany has encroached on both sides of the Rhine below Wesel and on both sides of the Vechte below Nordhorn. (See suggested frontier alteration on Fig. 1.)

Now the fundamental reason for the necessary remaking of political frontiers in Europe in the immediate future is precisely that certain political units which violate every reasonable ethical and ethnical

[1] The Naval Powers bought up the Dutch toll-rights on the Scheldt in 1863.

principle, and have been able to do so because of their own military strength and the political impotence of other Powers, have recently been attempting at once to improve their strategic position and to extend

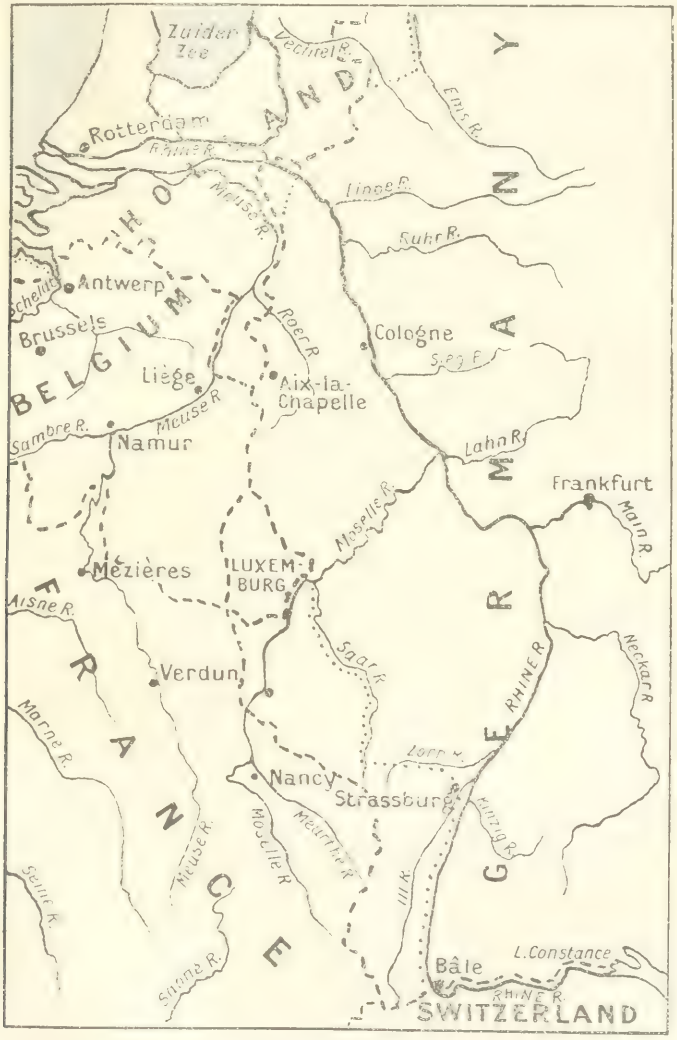

FIG. 1.—Western Frontiers.

---- Present Frontiers. . . . . Proposed changes.

their political domination. Moreover, they have done this in an area about which we have a very large amount of accurate geographical knowledge, including thoroughly scientific maps; and we are able to judge the various geographical features on their own merits. For even between states that are not comparable in size and strength, we may

effect an equilibrium—the equilibrium of equal local advantages with regard to the particular feature used for a frontier, an equilibrium of economic and strategic facilities that depend entirely on the local conditions; and the arrangement which guarantees this, will favour the wider equilibrium of political peace and common humanity.

This at once suggests the extreme desirability of choosing a feature which *combines* different kinds of advantages, and guarantees peoples meeting easily in times of peace and yet having a real security against attack in war. That is to say, we have the opportunity of combining a strong and definite physical fence with the best of all aids to the peaceful meeting of the peoples on opposite sides of that fence.

And this, for our age and outlook, is surely an ideal. For the frontier of to-morrow cannot be merely a national feature, enclosing and isolating a nation of recluses; it is to be essentially an *inter*national feature, effecting some approach to equilibrium. It must, therefore, satisfy certain conditions—in character and in influence: it must have geographical attributes which can serve political ends.

In the first place, it should be obvious and indisputable—if only to save expenses of demarcation; and the history of the relations between *e.g.*, New South Wales and Victoria, or Chile and Argentina, proves the importance of this, especially the difficulty and expense of obtaining such a line in mountainous country. The history of the Australian dispute—fully and admirably told by Mr. I. C. Ogier in the *Victorian Geographical Journal* for 1912, vol. 29—is most instructive. It is perhaps a misuse of language to call the Murray a navigable river; there is the old "chestnut" about the unfortunate Chinaman who was fined £100 because a sudden change in the river's course had put him into Victoria! But it was—significantly—not the Murray that caused the dispute in question. The same is true of the Plate. Its great components have been the political frontiers of the area since—as well as during—the days of the Spanish viceroys; they are guilty of what one speaker at the Newcastle meeting thought a fatal objection to river-frontiers—*i.e.* changing their channels, and do it often every day for weeks together: and actual war, of the deadliest kind, has been waged in the basin. But in no single instance has the river frontier caused friction. In times of revolution, *e.g.* in Paraguay, rebels have crossed the river, but in no case has international friction been the result. The waterway, in spite of all its vagaries, has remained the obvious, the indisputable, the permanent frontier.

Contrast this with the other great frontier of the Argentine, especially in the light of Sir Thomas's own eloquent description of his ideal frontier—a range of gigantic mountains.

"It may happen that they stand alone, untouched for miles by artificial designs, as great and impassable border lands, in the midst of which the boundary follows the great divides, majestic, unapproachable, immovable, subject to no vicissitudes of natural force short of violent earthquakes, requiring no artificial boundary marks for definition, no ridiculous waste of money over demarcation, no expenditure in boundary upkeep, presenting on either hand a magnificent wall of defence, unbroken, impressive, defiant."

Written by a man who has demarcated a frontier within sight of such scenery, it is convincing. But it would be a misuse of words to call such a feature a political *frontier*, and Sir Thomas did not: he only called it "an amazing natural *boundary*"; and there can be no question that such a boundary prevents even peaceful intercourse across it. Yet somewhere there ought to be a continuous line where, *e.g.*, British territory merges in Russian; and the day will come when such a line will cause dispute—because it is disputable. A patch of metal-bearing alkaline earth would at once raise the question of ownership. Where the barrier is not so overwhelming, and even the water-parting may be vague and "misplaced," as in the Southern Andes, the difficulty of adopting a mountain frontier[1] is almost insuperable. It is only a dozen years since Sir Thomas completed his remarkable work on the Chile-Argentine frontier; the award was accepted absolutely by both governments, and both have tried to carry it out with conspicuous honesty and good faith. Yet, through the courtesy of Mr. Ernest Gibson of Los Yngleses—to whom I am indebted for much accurate information about the conditions on the spot—I have direct evidence of the great anxiety felt by both governments about the constantly growing friction along the line of the award. No doubt, Latin America is liable to marked instability in its political arrangements; but, that being the case, it is surely all the more remarkable that the Plate—above the estuary—has been a frontier for nearly four hundred years, that it supplies to-day nearly 2000 miles of frontier to Paraguay, Brazil, Uruguay, and Argentina, and that it has never been a cause of political friction, though it has been the great thoroughfare of the region.

And this is just what we want. For a political frontier, as an international feature, should be no check on peaceful intercourse, while a very great check on unpeaceful intercourse. No doubt, in one sense, mountains, deserts, and swamps are little or no check on peaceful intercourse, because there is little or no intercourse of any kind across them; but we want much more than this, even granting that this "in one sense" is not a mere quibble. For civilisation is progress in the art of living together, and it is long now since the world became an economic unit: the price of a bar of chocolate or a Christmas orange assured us of that even in the days of our youth. We want, therefore, a feature which actually encourages peaceful international intercourse, and it will be readily admitted that in this respect the navigable river stands easily first, involving a maximum of peaceful associations. It is a feature on and along which men do naturally congregate in peaceful occupations, and where even the most discordant elements can show only a minimum tendency towards discord. Indeed, it is obviously the most important, the most universal, the most permanent, of all such features. On the contrary, men do not naturally meet in their normal occupations on mountain crests or water-partings, in deserts or swamps. In a navigable river, then, we have a feature encouraging a maximum of peaceful tendencies.

[1] Mr. Heawood has recently reminded me of the relative importance attached by the early Spanish governors in South America to rivers and mountains, "Es de notar que el paso de un rio ofreció mas obstaculos que el atravieso de la áspera Cordillera."

What about security? Sir Thomas declares that "rivers, perhaps, rank next in value to mountain chains," but only where *not* navigable!

"Indeed it entirely depends on the conditions of environment whether a river makes a good boundary or a very bad one. Where the surrounding country is a waste of trackless forest or of wild upland, and where the river is confined to a narrow channel in a rock-bound bed, it may be admirably adapted for a boundary. The Oxus from the plains of Badakshan to its glacier sources in the Pamirs is a case in point. Where it is confined within a narrow bed, rock-bound, and sunk beneath the general level of a wild stretch of deserted upland in its upper reaches,

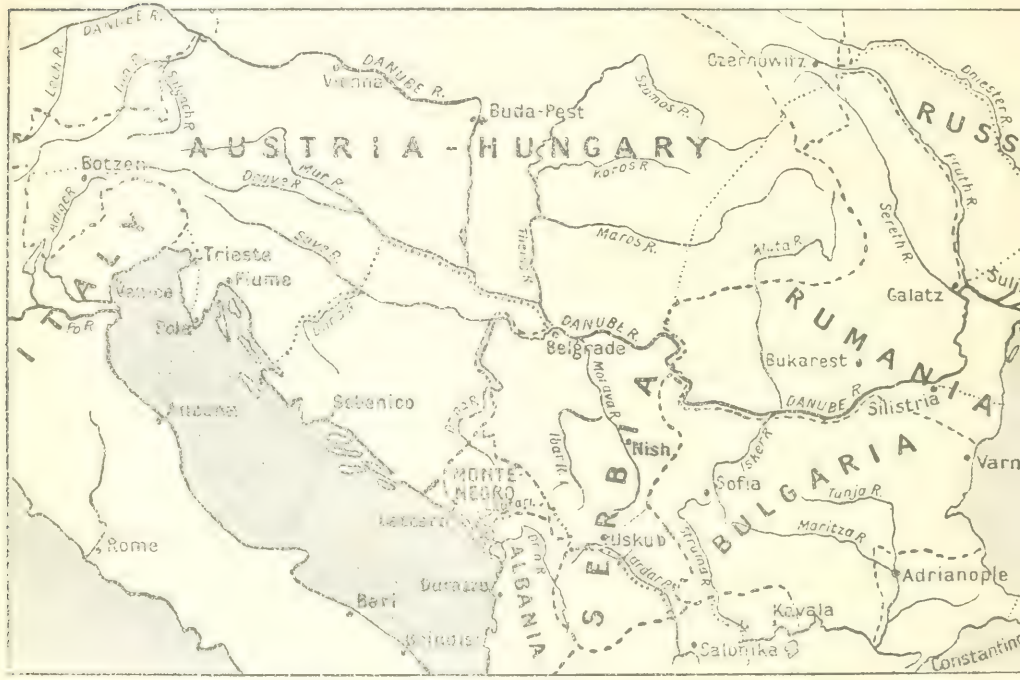

FIG. 2.—Southern Frontiers.
---- Present Frontiers. . . . . Proposed changes.

it makes an excellent boundary. Where, however, it emerges from the mountain regions into the plains, . . . it is really no boundary at all."

Surely, this needs correction in the light of recent events. From the accepted "military" point of view, Belgrade occupies probably the worst possible kind of position for a political capital, on the banks of a navigable river that itself forms the frontier of the country; and yet that river proved an absolute defence to the city for four whole months during the second Austrian attack in 1914. And what of the great Russian retreat? The story of its commencement is a catalogue of rivers from north to south—Dubissa and Bobr, Bzura and Rawka, Dunajec and Biela, etc., and the story of its conclusion is a similar

catalogue—Sareth and Styr, Shchara and Niemen, Viliya and Dvina, etc. Of course, the riverine marshes were of vital importance during the whole retreat; but it is *not* to the marshy sections of the rivers that I wish specially to refer. The really significant sections were those which were *not* marshy, and—because not marshy—had parallel railways behind them, *e.g.*, the Bug south of Brest-Litovsk, the Vistula south-east of Ivangorod (north-west of it the banks are marshy), the Shemyana north and south of Podbrodze, the Niemen between Mosty and Grodno, or the Rossa north of Volkovisk, etc. These and similar cases have proved that a river backed by rail gives a defensive position of enormous strength; and this is all the more remarkable when one remembers that the lines referred to run for miles within range of fire from the opposite bank, running, *e.g.*, for 30 miles within 3500 yards of the Shemyana, for 30 miles within 5000 yards of the Bug, etc. But, of course, the railway support is the essential factor, and the preference of commercial railways for such riverine ground needs no proof.

All things taken into consideration, it is even possible that such a rail-backed river is a stronger defensive position than any normal mountain range that is crossable at all, and that is even crossed by rail at one or more isolated points. But there is no question that, even if the mountain range is the stronger defensive position, it is *not much* stronger, while it is infinitely inferior to the river for all other purposes. Certainly, the normal mountain range is steeper on one side than the other, thus favouring the nation holding the gentler slope, and that nation might be—as Austria has been—the aggressive one; it is also normally developed in arc-form, so that transverse routes, whether good or bad, converge on the steeper side, as routes from Austria converge on Italy. Want of equilibrium here depends entirely on the geographical feature, and in no way on the relative strength of Italy and Austria.

But, as Sir Thomas pointed out, it is precisely ranges and water-partings that have been adopted hitherto for international boundaries in Europe; and, as a matter of fact, in this war—like deserts and seas to some extent—they have proved completely inadequate as a defence. In the face of recent events then, one must offer respectful admiration to the courage of those who recommend the continuance of a system which has helped to involve us in such misery and disaster; and one may perhaps venture to suggest, as an alternative, the adoption of a navigable river as the most appropriate feature for a frontier wherever there is such a river "in the neighbourhood." Such rivers are already great commercial media, adverse to isolation and exclusiveness, and favourable to the elimination of cultural and linguistic barriers between riparian peoples. Further, a navigable river is the easiest natural line of access inland for outside ideas, and along it *international* tendencies must be—and are—relatively strong. Comparison of South America with Africa, south of the equator, is sufficient proof of this: but more to the point for the moment is the absolute equality of all shipping, *e.g.* at Sulina, as of all riparian owners along the Lower Danube. The natural unity of the river valley, so far from being an objection, is a positive advantage. We *want* the two nations to be unified in all except

political allegiance; and the similarity of geographic control, with the accompanying similarity of human development, is a net advantage on the side of peace. Further, a political frontier, after all, is the embodiment of a formal contract: and such a conception—as illustrated on the Danube—has much more force with the commercial community which is normal along a navigable river, than with the nomad Highlanders who are the natural occupants of a mountain barrier.

Such arguments as have been brought against the adoption of the river-frontier, are neither convincing nor always well founded. The belief that "there is a tendency in the case of every navigable river to become the exclusive property of the most pushing nation on its banks" finds no support in the Plate, or the St. Lawrence, or the Lower Danube; and the whole frontier policy of Imperial Rome was based on precisely the converse. Here, again, the Plate is convincing. The Argentine is very much the strongest, largest, richest, and most populous State along it: and the city of Buenos Aires is much the most influential user of the river. Yet careful inquiries have failed to produce any kind of evidence that the State or the city has exercised, or is exercising, any such domination. No differential treatment of any kind is common—I have not been able to hear even of an isolated case; and no friction has actually occurred.

Again, the military dangers which have been suggested in connection with such a frontier, seem very flimsy in the light of the official correspondence about the closing of the Drifts on the Vaal,[1] though, of course, the Vaal is no more than the Murray a navigable river. And the assertion that rivers are not chosen as administrative boundaries is certainly not founded on political or historical maps, *e.g.*, of England, France, the United States.

In adopting a navigable river, however, we might meet what Sir Thomas Holdich considers so important, the desirability of having an actual space boundary between the opposing nations. For the desirable "buffer" can be secured by extending the idea of the Danubian Commission and making the fairway of the river international—under an International Commission, national rights being only riparian. This would provide a neutral traffic zone (free to all alike) similar to those already established even on land in various places, *e.g.*, between France and Italy, France and Switzerland, Mexico and the United States. These zones, so far from causing difficulty in administration, have been most successful, even along the Rio Grande, eliminating smuggling and greatly favouring normal trade. Of course, they supply an admirable object lesson in the value of keeping trade really "free"; and where such a river, though still navigable, became too narrow for such an international zone, the influence of the zone lower down the river would unquestionably affect the higher reaches.

But in discussing such a subject to-day, we all have at the back of our minds certain facts—facts of much abused nationalities, of scientific savagery, of dishonoured scraps of paper: and we are intensely anxious to find a settlement—to be embodied in a new scheme of frontiers—which will make a repetition of evils practically impossible. Now the

[1] *Imperial Blue-book*, C. 8474.

means to do ill deeds that led to these ill deeds being done were—coal, iron, and potash; and the distribution of these commodities in Germany has a vital bearing on our problem. One of the much abused nationalities is in Alsace-Lorraine; and the advance of the French frontier to the Rhine would not only put an end to "Zabernism," but would cripple

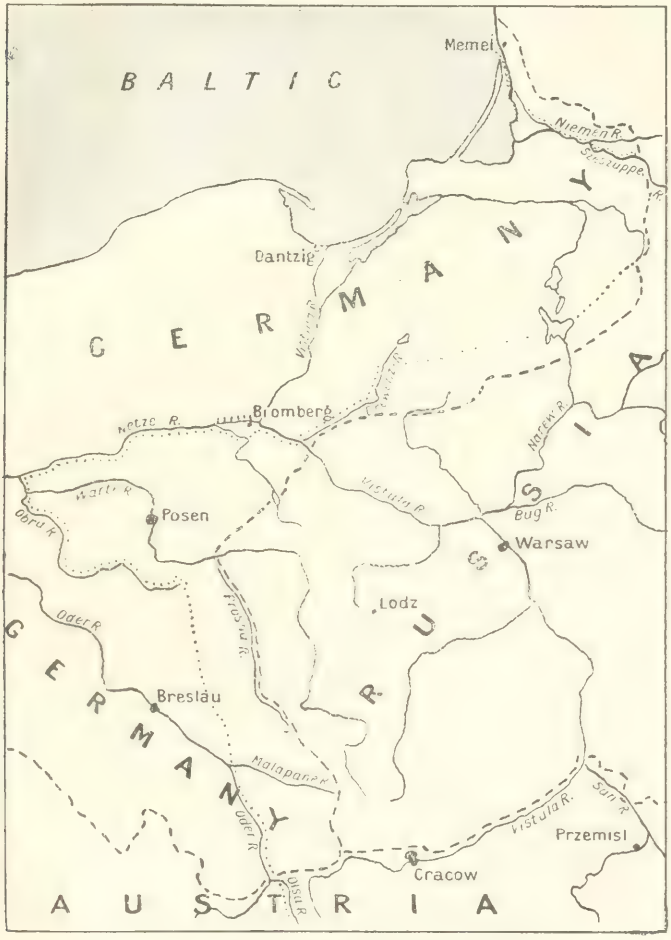

FIG. 3.—Eastern Frontiers.
---- Present Frontiers. .... Proposed changes.

Germany's power for evil in the west. In the year before the outbreak of war Germany obtained 21,000,000 out of a total of 28,600,000 tons of iron ore from Lorraine; in Alsace there is one of the great fields of potash which have given Germany more or less a chemical monopoly; and between the iron and the potash is the Saar coalfield, supplying 7 per cent. of the total German output of coal. To restore this area to

France would completely cripple the German steel industry, and would instantly break the German monopoly in the supply of potash, *i.e.*, the base of calico-printing, dyeing, explosives, etc.—the Alsace deposits being much richer in sylvite (practically pure potassium chloride) than the deposits elsewhere in Germany. These deposits have been the sheet anchor of German agriculture and the German chemical industry, as the Lorraine iron ore has been the sheet anchor of German metallurgy.

What has happened in Posen, in the story of crass brutality, is less well known than what has happened in Alsace: but in many ways the treatment of the Poles has been even worse than that of the Alsatiäns. If the Upper Oder becomes the new frontier of Germany, it will involve the loss of what is probably the most important coalfield in Europe—though at present it supplies only 25 per cent. of the German total—the richest zinc field in the world, and very valuable deposits of iron and lead. Thus, again, in the east, Germany's power for evil would be crippled. (See Fig. 3.)

No doubt, the crafty National Kartel scheme, which has been entrusted to Dr. Streisemann, as organiser, and Herr Georg Münch, as intelligencer, is devised to compensate partially for even such momentous changes—but not unless the German mercantile marine is *not* compelled to make good every ton of Allied shipping which has been sunk by German submarines. And this is a matter on which we have some confidence in asserting—*pace* the political pundits—that the Allied nations have already made up their minds.

This particular matter is strictly pertinent to the real objective of our discussion—the choice of geographical features that are favourable to *International equilibrium*. Before the war Germany had only two rivals in the ocean-carrying trade, Norway in the smaller branches and Britain in the larger: and the Select Committee of the House of Commons on Shipping (1901-1902) collected conclusive proof that there was no trick too despicable for Germany to use in its efforts to injure its two rivals. The present outburst of destructive brutality at sea is only the obvious sequel—the supreme and final effort to eliminate competition by decimating the mercantile marine of these two rivals: and the whole principle of international equilibrium sanctions, and even demands, what will be really a statesmanlike restitution of equilibrium.

It would seem necessary, therefore, to extend our idea of frontiers as factors in international equilibrium so as to include the question of economic equilibrium. For there can be no proper political balance of power while there is gross monopoly of such economic media of equilibrium between comparable states—as the mineral bases of industry in peace and in war: and it is a matter of no moment whether such monopoly is due to the deliberate adoption of scientific savagery and the calculated violation of international law and custom by interested parties or to the criminal ignorance and sentimental stupidity of third parties who sanctioned the particular frontier.

But even with this extension of our idea a further precaution is necessary: it is to discountenance absolutely any such delimitation of frontier between comparable states as would give either of them an

excuse or an opportunity for making a sudden attack on the mineral bases of the other, as Germany did in 1914 on the mineral fields of France. And here again the river frontier has a distinct value. No one pretends for a moment that the waterway ever makes a mathematical bisection of its basin: but it is indisputable that it does hold generally a fairly even balance between those lateral features which at once "contain" the basin and are so often rich in mineral wealth.

Obviously, then, in the delimiting of frontiers to-morrow the question of defence cannot be confined entirely or even mainly to purely military considerations, for other considerations are far more important. Amongst these others by no means the least important are those of a purely economic character. Now the whole purpose or proper work of Economic Geography is to envisage the world as a unit, with each human type —farmer or miner, mountaineer or seaman, Japanese or Belgian—in its proper place and contributing its special item to the common good. And just as, physically, we have natural regions—major and minor—with their natural products, so we have, politically, natural groups—large or small—with a natural community of sentiment, racial or otherwise. Each natural group is a natural nation or nationality, and has more or less natural limits of distribution: and where these occur in the neighbourhood of a navigable river, that river should be made the political frontier between the two units, each sharing the river basin, as it shares the comity of Europe. The insistence on physical barriers and purely military frontiers denies alike the fundamental economic unity of the world and the dawning political comity of Man, and sanctions the discredited superstition that there is something permanent and sacred in the accidents of power and in the heritage of an unscrupulous dynasty. The river frontier cements the economic unity, and ignores dynastic legacies based on the delusion that a river basin must always be an appropriate political unit: its acceptance implies full recognition that the growth of "nationality" means the rise of democracy, and its ultimate victory will displace to-day's flabby and maudlin cosmopolitanism in favour of that true internationalism of to-morrow which will be simply a stable condition of friendly relations between patriotic and coherent democracies.

If the new map of Europe is based on purely military lines, Europe will have to expiate it—once more—on purely military lines.

THE NEWCASTLE MEETING OF THE BRITISH ASSOCIATION.

THE British Association met once again this year under the shadow of war, a shadow even deeper than last year if one may judge from the attendance, which fell to 826. This was, however, perhaps partly accounted for by the fact that the opening of the meeting coincided with a three days' holiday, which was somewhat unexpectedly declared throughout the district, and no doubt diminished the number of local

members. Except on the opening day, when the meetings were sparsely attended, Section E did not seem to suffer very greatly from the reduction in numbers, though it was unfortunate that Section H (Anthropology) should have chosen one of the three days available for sectional meetings for the one big excursion of the week. This was to the Roman Wall, under the guidance of Professor Haverfield, and owing to the highly attractive programme it took away a number of members from E. The anthropologists met on Saturday morning to make up for the missed day, but the other sections confined themselves to the three usual working-days, and a number of them probably suffered from diminished audiences owing to the attraction exercised by the prospect of a day in the open air, in fine weather, spent in a most interesting district, visited under expert guidance.

The proceedings opened on Tuesday evening, September 5, with the delivery by Sir Arthur Evans, President of the Association, of his address on "New Archæological Lights on the Origins of Civilisation in Europe: its Magdalenian Forerunners in the South-west and Aegean Cradle." The most interesting point about this address was the suggestion of some kind of affinity between the images of squatting female figures found at Knossos and the somewhat similar images found in connection with Aurignacian deposits in Southern France.

The sectional proceedings opened the following morning, when Mr. E. A. Reeves, in the unavoidable absence of Mr. D. G. Hogarth, delivered the presidential address to E, which we printed here on p. 449. Mr. Reeves was followed by Professor H. J. Fleure on "France: a Regional Interpretation," and by Mr. G. G. Chisholm on "Generalisations in Geography, and more especially in Human Geography." Both these papers have appeared in the pages of this *Magazine* (p. 519 and p. 507). In the afternoon Dr. W. S. Bruce delivered an illustrated address on the "Weddell Sea," in the course of which he summarised the results of a series of investigations which he has been making into the history of the exploration of the area, and the possibility of reconciling the statements of different observers. Dr. Bruce devoted a considerable amount of attention to an examination of Morrell's statements, for he believes that the accuracy of this explorer has been unjustly impugned. Dr. Bruce is still pursuing his researches, and we hope to have from him an article on the subject at a later date.

Thursday morning was devoted to frontier problems and the Adriatic question, but the absence of two of the proposed speakers, and of various members of the section who might have taken part in the discussion, but who were unable to resist the attractions of the Roman Wall excursion, were disappointments. Sir Thomas Holdich opened the proceedings with the paper which we printed here on p. 497. His paper was to have been followed by remarks by Professor L. W. Lyde. The latter was, however, unable to be present owing to illness, and though he sent some notes, which were read by Mr. B. C. Wallis, these necessarily, as a part of a discussion, suffered from the fact that the author had not heard the previous paper. Briefly, it may be said that Professor Lyde took precisely the opposite position to Sir Thomas

Holdich, maintaining that a navigable river is a much better frontier than a mountain range. It is not necessary to enter into further detail here, for Professor Lyde contributes an article to the present issue on the subject (p. 545), in which he states his position more fully.

The frontier papers were to have been followed by two on the Adriatic. One, by the editor of this *Magazine*, was read and appears here on p. 466. The other was to have been delivered by Dr. Seton-Watson, but at the last moment Dr. Seton-Watson was prevented from coming, and did not send a paper. The discussion on the frontier papers was postponed till after the reading of Dr. Newbigin's paper, in the expectation that the two Adriatic papers would deal with frontier questions. In the event this proved unfortunate, as there was only one Adriatic paper, and it did not raise broad frontier questions. Sir Arthur Evans was present during a part of the paper, and opened the discussion in a speech in which he strongly supported the aspirations of the Southern Slavs, giving it as his opinion that Italy should not claim more than Trieste, which should be a free city and a free port, the west coast of Istria, Pola, certain islands and Valona, but not more, and that she should strive not to alienate the new nationality of the South Slavs. Subsequently the discussion was taken part in by Mr. Chisholm, who made the interesting suggestion that modern science might make it possible to restore Aquileia to its former position as an important port, and that it might then, with a slight frontier change, become a valuable outlet for Italy in the North Adriatic, and thus diminish the importance of Trieste. Mr. Chisholm also pointed out that where navigable rivers form useful boundaries, as between Rumania and Bulgaria, it is rather the nature of the ground near the river which determines the suitability than the actual waterway. He stated also that where in North America navigable rivers had been chosen as administrative or national boundaries, the determination had taken place in advance of the population, and subsequent settlement had disclosed their disadvantages, due to the fact that they draw the populations of their banks so closely together. Professor Gregory, Mr. Woods, and others also spoke. In regard to the general question of frontiers, several speakers pointed out that rivers are rarely chosen even as administrative boundaries, owing to difficulties connected with flooding, changes in the river's course, and so forth. At the same time sympathy was expressed with Professor Lyde's views, and there was general regret that he was not himself present to support them.

In the afternoon the Rev. Walter Weston delivered the address on "Recent Explorations in the Japanese Alps," which he has already presented to this Society, and showed his beautiful lantern views to a good audience.

On Thursday morning the section at first met jointly with C (Geology), to hear a paper by Dr. A. Wilmore on the "Physical Geography and Geology of the Northern Pennines." The paper proved to be on the whole more interesting to geologists than geographers, and it was only the former which took part in the discussion. At the same time Dr. Wilmore gave an interesting account of the historical signifi-

cance of the Craven or Aire Gap, pointed out its importance in relation to communications, and noted that, through the Gap, the cotton industry of Lancashire succeeds in penetrating into Yorkshire. He gave also some interesting descriptions of the scenery of the region described.

Subsequently Section E returned to its own room to hear a paper by Captain Rodwell Jones on the "Evolution of the Port of Hull." This paper was of a very detailed nature, and does not lend itself readily to the purposes of an abstract, but was a very thorough piece of work, more comprehensive than the title suggested, for it led the author to discuss the communications of the whole surrounding region, the development of canals and the improvement of navigation, the coming of railways, and so forth. Subsequently Mr. G. Philip exhibited some economic maps with which he had been experimenting, in an attempt to satisfy the conditions laid down by the Sectional Committee on Atlas, textual and wall maps for school and university use (cf. this *Magazine*, vol. xxxi. p. 576). On the motion of the Rev. W. J. Barton, it was decided that no immediate discussion of the maps exhibited should be undertaken, as they required careful study. The Committee undertook to give Mr. Philip's proposals their fullest consideration.

The rest of the morning was devoted to two papers by Dr. E. C. Jee on "Annual Variations in Temperature and Salinity of the Waters of the English Channel," and "The Periodicity of Sea-Surface Temperatures in the Atlantic Ocean."

In the afternoon Mr. H. Charles Woods delivered an address on "Salonika: its Geographical Relation to the Interior." In the earlier part of his lecture, Mr. Woods gave an interesting description of the port and town of Salonika. Possessed of a small modern harbour, in one sense the place is completely materialistic and vulgar, whilst in another it has the appearance of being a sort of relic of the past. This, said Mr. Woods, was in part due to the unique composition of its population. Out of a total of about 125,000 souls, approximately 75,000 were Jews. Besides these Hebrews there were about 15,000 Doumes—a sect whose exact beliefs were not properly known, from among whom the Young Turks recruited some of the ablest members of the Committee of Union and Progress. The Jews controlled the business of the city, and surpassed the Greeks in their commercial ability, as also in society.

Partly owing to its enclosed position, the heat in Salonika during June, July, August, and the first part of September is intense, particularly at night. Mosquitoes are so numerous that it was advisable to sleep under nets almost throughout the year. Between the 10th and 15th of September the atmosphere is cooled by the heavy rains which invariably fall then. In the town there is seldom a heavy fall of snow, but in the hills in winter the roads are often stopped by snow, and by the difficulty of fording the rivers when they were swelled by the winter rains or by the melting snows.

It is impossible to consider Macedonia as a concrete whole. Politically and geographically it is divided into water-tight compartments. It is a locality possessed of certain well-defined routes which

constitute natural lines of communication. The Vardar Valley, dividing east from west, and with the Morava Valley constituting the great highroad from south to north, make Salonika the natural port of a large area of the Western Balkans. The importance of the valley and of the port are interdependent, and for this reason Salonika and its surroundings, in Mr. Woods' opinion, should either belong to the owner of this valley, or the valley should be annexed by the owner of the port.

With the assistance of maps thrown upon the screen, Mr. Woods described the country which immediately surrounds the town in considerable detail. Whilst on the west of the Vardar it is low and marshy, on the east it is hilly, if not mountainous. The line of mountains and lakes which runs across the Chalkis Peninsula constitute a naturally strong defensive position, for the front is almost entirely protected by the lakes and by the swamps which lie between and to the east of them. The various areas which had been occupied by the Allies after their retirement last winter are served by two railways and by several roads, the condition of which used to be bad.

The lecturer went on to suggest the various roads and lines by which it was possible to push forward into the interior from Salonika, stating that there were three more or less distinct routes, namely, those which run in the direction of, or *via* Monastir; those by or leading from the Vardar Valley; those which connect the Aegean Plain with the interior of Bulgaria, whose positions are governed by the all-important Rhodope Balkans. Unless they have been doubled by the Allies, all the railways are single; most of the roads are out of repair, and many of the bridges are in bad condition.

Partly owing to the lack of adequate communications, the difficulties of conducting a campaign in Macedonia are considerable. The Vardar Valley is so narrow that a great part of it is traversed only by the railway, and not by a road. The ordinary means of transport and big guns must for the most part be replaced by mountain artillery and pack horses, which can traverse roads not passable for wheeled traffic. The drought of the summer, which always made water, except in the actual valleys, a difficulty, places upon the supply section of the army a burden destined considerably to increase the magnitude of their task.

Mr. Woods was followed by Mr. B. C. Wallis, who read a short paper on "Some Geographical Aspects of a War Indemnity," which was followed by a discussion. The paper was felt on the whole to belong rather to economics than to geography proper. It was chiefly concerned with the discussion of methods whereby, in the event of an Allied victory, the damage done deliberately by enemy forces in Belgium and North France to industrial concerns might be speedily rectified, while at the same time the enemy countries were not permitted to avail themselves of the economic advantage of having their own factories, mines, forests, and so forth intact, in order to capture trade in the period immediately following the war, while the process of reconstruction was going on in the devastated lands. Mr. Wallis's special point was that any indemnity should be paid at least largely in kind, and that some sort of

geographical survey was necessary to determine the particular form which it should take.

The following Report, which was submitted to the Committee of Section E by that of Section A, and formed the subject of a joint-discussion between the two Committees, is of interest:—

Report on the Future of British Geodesy with special reference to the United Kingdom and the Crown Colonies and Protectorates. By Sir F. W. Dyson, Colonel C. F. Close, and Colonel E. H. Hills.

1. *Controlling Organisation.*—There is no department, institution, or society in the United Kingdom whose special business it is to deal with the higher geodesy. The Ordnance Survey carries out certain geodetic operations which have a practical bearing, as, for instance, the geodetic levelling now in progress. The triennial meetings of the International Geodetic Association are attended by British delegates. (It had been decided before the war that one should be nominated by the Royal Society, and that the Director-General of the Ordnance Survey should be nominated by the Government.) There was a British member of the Permanent Committee of this Association nominated by the Royal Society. The revision of the Magnetic Survey is being carried out by Mr. G. W. Walker, assisted by the Ordnance Survey, under the direction of a Committee composed of representatives of the Royal Society, the Ordnance Survey, and the British Association. Mr. Walker has finished the field-work of the revision excepting as regards certain islands. As the result of the representations of the British Association, a test was made of the accuracy of the Principal Triangulation of the United Kingdom by the measurement of a new base and subsidiary operations, by the Ordnance Survey, in 1909-12. No gravity operations have been carried out in the United Kingdom since the year 1818. The Colonial Survey Committee deals generally with geodetic questions affecting the Crown Colonies and Protectorates. Its principal effort in this connection was the measurement in 1909 of $2\frac{1}{2}$ degrees of the arc of the meridian of 30° E. in Uganda. Towards the cost of this the Government, the Royal Society, the R.G.S., the R.A.S., and the British Association contributed.

2. *Future of the International Geodetic Association.*—It is doubtful whether the organisation of the International Geodetic Association has had an altogether good effect upon the study of geodesy in this country. It has concentrated the apparatus of information and inquiry at Potsdam, and, though very good work has been done, and some international arrangement is clearly required, the present system is not a satisfactory one for British geodesists.

One of the most useful branches of the work of the International Association has consisted in the regular determination of the movement of the Earth's Pole, from observations made on the same parallel of latitude with almost identical instruments and programme of work. This is of a peculiarly international character, as several observatories widely separated in longitude are necessary. Observatories in Italy, Asiatic Russia, Japan, and the United States (three stations, one of which has been recently discontinued) have co-operated. The observations are discussed at the Bureau at Potsdam, and preliminary results have been published annually in the *Astronomische Nachrichten*. It is very important that observations of this character should be continued both from the geophysical standpoint of preserving a continuous record of the movement of the Earth's axis of rotation, and also because a knowledge of the variation of latitude is necessary for the accurate determination of astronomical declinations.

A correspondence took place last year between the Ordnance Survey and M. Ch. Lallemand, representing the French members of the Geodetic Association, in accord with the Russian members. The French and Russian members proposed that the Central Bureau should not continue to be attached to the Prussian Geodetic Institute. The Board of Agriculture and Fisheries referred the correspondence to the Royal Society. The Council of the Royal Society stated that they would support a proposal that the locality of the Central Bureau should be left to the choice of the General Conference, and continued: "The Royal Society does not wish, however, to commit itself to the opinion that no other changes should be made in the Convention, or even that the Geodetic Association should be continued after the expiration of its present period. They would prefer, therefore, that the whole discussion of the matter should be adjourned till after the conclusion of the war." The Convention renewing the International Geodetic Association expires on the 31st December next.

3. *Future Organisation.*—The first difficulty that has to be faced in connection with any serious revival of the study and practice of geodesy as a national, as apart from a private, undertaking is the want of trained men for the work—men, that is, who combine an adequate knowledge of the mathematics and physics required with a taste for the subject and practical experience of the observations. Such men exist in the United States, in India, in Germany, and elsewhere, but there are not many in this country. There is, in fact, no training in the subject and no school of geodesy in the United Kingdom.

The second difficulty is that no public department nowadays can expect to obtain a grant from the public funds for any purpose which has not an obvious and immediate practical object. Thus, it is possible for the Ordnance Survey to spend money on accurate levelling and in assisting a magnetic survey. But it is not at all likely to get authority to carry out a gravity survey. Much might be done, however, if the Schools of Geography at Oxford and Cambridge directed their energies into scientific channels, if they became, in short, Schools of Geography and Geodesy. Substantial annual grants are at present made by the R.G.S. to both these schools. Perhaps the British Association would give grants if there were an undertaking that geodesy should be given an important place in these schools. Other sources of supply could be tapped. Arrangements might be made with the Colonial Office to give students of geodesy trained in these schools a claim on certain appointments. A School of Geodesy is the first thing needful. Such a school should be in close touch with the more practical side of the work as carried out by the Ordnance Survey and Colonial Surveys, but should deal more especially with new investigations. The inclusion of Geodesy as a subject in the second part of the Mathematical Tripos would probably encourage the study of higher geodesy.

4. *Work to be Done.*—As regards the work to be done, the principal matter of the old geodetic type requiring prosecution in the Crown Colonies and Protectorates is the completion of the arc of meridian along 30° E. in Africa. No work of this sort appears necessary in the United Kingdom.

With regard to vertical movements of the crust, the new geodetic levelling of the Ordnance Survey which is being carried out will provide a sure foundation for the future. Gravity surveys with improved and simplified instruments, and the interpretation of the results and their relation to topographical features and geological structure, and similar studies, should be the proper task of a School of Geodesy, so also should the correlation of these inquiries with seismological, magnetic, and other investigations. An up-to-date English Text-Book of Geodesy is badly wanted.

5. It is suggested that copies of this Report should be sent to the proper authorities in Canada, Australia, South Africa, India, and Egypt.

Next year the Association is to meet at Bournemouth, the exact date not having been fixed. The Hon. Sir Charles A. Parsons is to be President. An invitation to meet in Cardiff in the year 1918 was unanimously and gratefully accepted.

TRAVEL MEMORIES.

By Lieut.-Colonel A. C. Yate.

(*With Illustrations.*)

If I commence these "Memories" with the year 1879, it is not that the previous twenty-six years of my life had seen no travel—indeed my very first insignificant visit to the Continent was fraught with most momentous consequences for me—but that the years 1879 to 1890 were those in which travel had for me one definite object. That object is summed up in a political phrase, once on every one's lips, now in abeyance, "The Central Asian Question." Let me here differentiate between travel and active service. The latter led me into travel, now and again, in regions which no European foot had, perhaps, before trodden, but which had no concern with Central Asia or its "Question."

February of 1879 saw me bound for India on one of those wonderful old troopships, the *Malabar*. What a target for a submarine; eight knots an hour! During the stifling descent of the Red Sea, the light breeze being aft, and travelling just the rate of our old vessel, the captain (R.N.), in his most considerate moods, turned her round, head to the wind, to expel the asphyxiating humours. We subalterns took our watches, and during them at night visited the troop decks: by day too, but the night, when all were below, was the real ordeal. The atmosphere defies analysis. The most trying watch was that from midnight to 4 a.m., and grateful we felt if, about 2 or 3 a.m., the naval officer on the bridge sent us along a cup of cocoa. Officers of that period all remember the "horse-boxes" and "pandemonium," to describe which fully would demand the pen of a Milton in one of his darkest moods. "Pandemonium" was a paradise compared to the thronged troop decks at night. And one night, when the sea was quite moderate, the thousand odd soldiers on board, officers, men, women, and children, found themselves battened down. What a night! The marvel is that a ghastly tragedy, like that of the recent appalling troop-train journey from Karachi to Sukkur, was not the result. All I heard the next day was that the captain explained, in reply to some remonstrance, that the "carpenter had made a mistake." Carpenters' mistakes have been known to cost lives. A decade later I was again descending the Red Sea in a P. and O. running that leisurely "thirteen knots" which was all that the Postmaster-General in those days could or would exact, when an Orient liner running fifteen knots passed us. The P. and O.

skipper did not like it, but his fuel-limit was strict. We put into Aden harbour about three hours after the Orient boat, and heard that two, if not more, of those on board her had died *en route*. The following breeze travelled just fifteen knots, so that our thirteen knots gave us an occasional whiff. We were all alive, passengers and crew, and recognise the debt of gratitude that we owe to the Postmaster-General.

I went out to India after three and a half years' service with a West India Regiment: and here I will mention a fact which may possibly be a warning to young officers entering the Service. I passed third in the Army Examination in July 1875. On 10th September 1875, one hundred officers were gazetted over my head to Line Regiments. I was gazetted on 22nd September to a West India Regiment. A score or so of that hundred were subsequently graded senior to me in the Indian Army. My attaining the command of a regiment was thus delayed two years, and I left the Indian Army at the age of fifty-two, not having had time to put in the three years of command which earns, automatically, the grade of Colonel. These are War and India Office methods and their results.

A troopship journey from Southampton to Bombay, or indeed any journey by that stereotyped overland route—can it be called "travel"? A reversion to the forties of the nineteenth century, when the Euphrates Valley and the Isthmus of Suez were dividing the suffrages of the experts, evokes strenuous memories of life sacrificed, and zeal and ability recognised too late. A troopship took nearly a month in 1879 to reach Bombay. We called at Queenstown, and while the *Malabar* shipped the gallant Seaforths, we young and irresponsible subalterns trooped off to Blarney Castle and kissed the stone. Let us pass over the voyage through the Bay, past Gibraltar and Malta, where the Church of St. John and the Strada Reale, the Club, and the Theatre divide dim memories, to the Canal. One incident only occurs to me, the terrific wind from the African coast—it was spoken of as the simoon—which we encountered somewhere between Gibraltar and Malta. It came somewhat suddenly before anything could be made secure on deck. We were heeling over to the port side at a perilous angle, everything unfastened slid into the scuppers, and ropes, sometimes with blocks attached, were flying in the air. One block struck a quartermaster on the cheek and split the flesh right across. Strange to say it neither knocked him down, as far as I remember, nor stunned him.

The deposition of the Khedive Ismail Pasha did not take place till June of 1879. Port Said, when we arrived in February 1879, was a sink of iniquity. The murder of Captain Agnew of the 16th Lancers, when returning, after a successful visit to the Ismailia gaming tables, to his P. and O. boat, still lives in our memories, though the exact date escapes me. No ship in 1879 could pass through the Canal in a single day. We "tied up" at night. The snapping of a hawser sent us drifting right across the channel. We blocked the traffic. We were hauled off at last, and, after the Red Sea experiences which I have faintly outlined, we reached Bombay.

Service in India is not travel, and yet I may, I think, be allowed to

touch upon one or two rather out-of-the-way experiences which came in my way prior to crossing the Upper Sind frontier into Afghanistan in December 1879. In March or April of that year I found myself at Poona, alike ignorant of the native and his language. A certain rebel, named Wassudeo Balwant Phadke, had placed himself at the head of a gang of malcontents and taken to the jungles between Poona and Mahableshwar, where the governor (Sir Richard Temple) and commander-in-chief (Lieut.-General H. T. Warre) and the flower of society were at that season. Communications had to be kept open between Mahableshwar and Poona, and the Government safeguarded. In the vast jungles of the Western Ghats, round Wai and Satara, amid scenes associated with the name and exploits of the Mahratta Sivaji, among a rural population which, from fear or sympathy, withheld information, we sought the rebels, and sought them in vain. I had no sooner reached Poona, a few weeks after landing in Bombay, than I was off with a field officer and from 200 to 300 rifles to hunt for Wassudeo. Camping in the Wai jungles, when the rains broke, was a new phase of life. The fissured soil which had harboured scorpions (I found half a dozen in my box one day) became a sea of mud. We were camped in a mango-grove, and the tents, I recall with thankfulness, stood firm under the rain, being well trenched about. Our servants produced breakfast or dinner, alike undefeated by rain or by dust-storm. I was new to the country, *alias* a "Griffin,"[1] and all I saw interested me. I found a banyan-tree near Wai second only to the famous banyan on the Narbadda. I paced round the Wai banyan. It was 800 yards round. When a huge lizard bit me, a Mamlatdar (native official) prophesied fever. I had none. I met here one of the few avowedly native Atheists or Rationalists whom I met in India. I remember listening curiously to his plain words, as he pointed to the Wai Temple near which we stood (he was a Hindoo)—"Of course I don't believe in those things." I have a shrewd suspicion, though, that before his fellow Hindoos he found it expedient to be orthodox. Now and again a report about Phadke and his following—real or faked, who could say?—came in: and off we went in pursuit of them. We covered forty miles, putting the native ranks on mules, in one of these efforts. But the District Superintendent of Police never intended us to catch Wassudeo. That was a tit-bit reserved for himself, and won him a C.S.I. For years now he has been a chief constable in England, and not long ago we met again and exchanged memories of the outlaw-hunt of 1879. When Sir Richard Temple visited us, I commanded a guard of honour for him. Ten or twelve years later, when, I believe, I was regarded as something

[1] Vide *Memories of a Griffin*, by Captain Bellew, first published about 1830, a clever picture of Anglo-Indian life at that time. He says (page 1) "*Griffin*, or more familiarly a *Griff*, is an Anglo-Indian cant term applied to all new comers, whose lot has been cast in the gorgeous East. The late most excellent Bishop Heber, for example, who to the virtues of a Christian added all the qualities which could adorn the scholar and the gentleman, was nevertheless an egregious griffin, as a perusal of his delightful travels in India, written in all the singleness of his benevolent heart, must convince any one acquainted with the character of the country and the natives of India."

of an authority on Central Asia, Sir Richard was so good as to make me his guest in the dining-room of the House of Commons. We had a *tête-à-tête* dinner, and a most interesting talk about some of my travels, a talk not without its effect upon an article or book which my host was then writing. After dinner Sir Richard took me on to the Terrace of the House of Commons and, not inappropriately, contrasted that long vista of lamp-lights with the forest scenery of the Western Ghats, amid which we had met so many years before.

By the autumn of 1879 I had passed my language tests, and was sent off to a scene very different from the Ghats, to the plains of Upper Sind, the scene of the exploits of Jacob, Outram, and Napier in the forties of last century, and of stern fighting which is "caviare to the general." I joined the 1st Baluchis in December 1879, and I remained with the Baluchis till I vacated the command of the 2nd, *alias* 129th, in March 1905. It was the 2nd that won the first Victoria Cross ever conferred upon a native of India, very early in the trench-warfare of France in 1914. Before I joined the Baluchis I paid a flying visit to my eldest brother, since well known on the Russo-Afghan frontier as Chief Commissioner of Baluchistan, and as M.P. for Melton-Mowbray, and saw his political life in Rajputana. We both took part in the Second Afghan War, and immediately, on the conclusion of it, made our way via Persia, the Caspian Sea, and the Volga, to Moscow, and from Moscow via St. Petersburg and Berlin to Ostend and Dover.

When we consider how much history has been woven during the last forty years around the convergence of roads that lead from the plains of Upper Sind and the Southern Punjab to Kandahar, and so onward towards that country usually known to the natives as "Khurasan," and when we reflect for one moment upon the political, commercial and engineering schemes in the furtherance of which this region must play its part, there is ample reason, quite apart from military matters, why I should not pass over in silence the campaign of 1880 and 1881 in Southern Afghanistan. I hold that geography is most interesting in its relation to the aims of the human race. Its relations to science and its status as a science in itself are, in the main, outside the sphere of my studies. If the relation of geography to war, politics, commerce, religion, and the thousand and one conditions of the life of man and of the races of mankind, be not a theme meet for geographers, with what object have the expressions "military, political and commercial geography" been coined? I am not aware that the term religious geography has yet been used, but it carries with it a perfectly clear meaning, and the influence of geography upon religion might be made the subject of a volume just as interesting as the latest of the works of that eminent geographer, surveyor and demarcator, Sir Thomas Holdich, viz., "Political Frontiers and Boundary-making." We have the authority both of Lord Curzon of Kedleston ("Frontiers," the Romanes lecture for 1907) and Sir Thomas Holdich that literature possesses nothing in the way of a comprehensive treatise on "Frontiers." Subject to correction, I venture to suggest that "the influence of geography

upon religion" is also a theme that has not been worked out, and I hereby commend it as a theme of absorbing interest, capable of inspiring a *magnum opus*. Such a work might, I venture to think, prove that no power has so effectually broken down geographical barriers as religion. A few moments' reflection on the spread of Buddhism and Christianity, on the history of Islam, on the Chronicles of the Crusades, on the record of the Jesuits *in partibus infidelium*, and on the sublime, albeit tempered by human frailty, and far-reaching efforts of our own Anglican and Scotch Missions, would seem to me to justify this axiom.

I have been led, involuntarily as it were, into this digression. I will revert to the realm of geography, tinctured neither by war, politics, commerce nor religion, although, I must confess, my geography filters away into military channels just as naturally as molten metal into a mould, with a strong tendency to solidify there.

At the end of 1879 I found myself in the middle of that great expanse of loess that lies between the bed of the Indus at Sukkur and the base of the Baluchistan hills, that is, the southerly spurs of the Sulaiman range, where they approach the northern end of the Kirthar range, the "uncompromising wall" stretching from the Bolan Pass to the neighbourhood of Karachi. When I picture to myself the scenes and developments of which this naturally desert (unless the Indus be allowed to defy its banks and dams and flood it) tract has been witness, since the days when, in 1838, Sir John Keane marched across it at the head of the army which, under Lord Auckland's auspices, aspired to the functions of a "kingmaker" at Kabul, I see a wealth of topics, more or less geographical, such as might occupy me for a busy week. Living men remember well all the incidents of the Second Afghan War of 1878-81, when the terrific heat of the steppes of Upper Sind and the toll taken in the shape of transport animals by the Bolan Pass and the Dasht-i-Bedaulat at last roused the authorities to think about building a railway. The Upper Sind desert has from time immemorial been held to be typical of the future life of the Nether World.

Fortunately, when the defeat of Maiwand roused the Government of India in its hill-home at Simla to a sense of the culpable feebleness of the force left, when Sir Donald Stewart moved on Kabul, to protect Kandahar, the railway from the Indus to the mouth of the Bolan had been completed. Troops, British and native, had to be hurried from the plains of India to Quetta, despite the appalling August heat. Deaths from heat-apoplexy occurred, but that was unavoidable. Ice in abundance was provided, just as it was in May and June 1881, when the Kandahar garrison was withdrawn to India. Brigadier-General John Jacob, who gave his name to the cantonment founded on or near the site of the hamlet of Khangarh, has left on record that the thermometer in tents in the hot weather of Upper Sind stood at 130°, and even more. The railway from Ruk Junction (on the Indus Valley line) to Sibi, near the debouchure of the Nari River, and to Rindli, near the mouth of the Bolan Pass, was completed early in 1880. I was present at the inauguration dinner held under canvas at Sibi in February 1880. A few weeks later my regiment, the 1st (now 127th Queen Mary's Own) Baluch

Light Infantry, was under orders for Harnai and Sharigh, to protect the work of continuing that railway from Sibi up the Nari Gorge and through the Chappar Rift to the Pishin Plateau. The victory of Ayub Khan at Maiwand on the 30th July 1880 summarily suspended all railway work. I refrain, in the interests of geography, from dwelling at length on the really momentous movement of troops and railway staff and working gangs which cleared the way for Sir Robert Phayre's advance on Kandahar. I will merely mention that at Sharigh we left behind two tons of dynamite and a locomotive. When next Englishmen visited Sharigh, a deep and broad crater, worthy of a "Jack Johnson," had replaced the dynamite (we never knew how many Pathans' souls it wafted to Paradise), and what damage fire could do to the locomotive had been done. The Chappar Rift, some three miles long, with lofty cliffs overhanging a narrow channel, had at that time received little engineering attention. The northern end was still blocked by precipitous rocks through which loaded camels could just squeeze with care. When all the troops from Thal-Chotiali were massed at Sharigh, we were in strength practically a brigade. Passing the brigade through the Chappar Rift was no light matter. In the earlier summer, from the snowy slopes and heights of Kalifat and other mountains, the Pathans would bring most welcome loads of snow to cool our drinks. Since those days many a good markhor, ibex, and uriyal has fallen on those mountains to the rifle of British sportsmen. While encamped at Sharigh I walked freely in the neighbourhood, and more than once topping a ridge came face to face, at the distance of a few yards, with ibex or uriyal. I carried a revolver on those walks. The gullies by which streams worked through the successive ranges were wild, rugged, and gloomy. No junipers or "pencil-cedars," as I have heard some call them, were to be seen, as in the neighbourhood of Chotair and Ziarat, the summer resort of the Chief Commissioner of Baluchistan.

The news of Burrows' defeat at Maiwand reached us at Sharigh late at night by the mouth of Lieutenant Jennings of the Royal Engineers, then employed on special political duty. He had already made a very long ride, but he only waited to tell his story to the senior military and railway officers, and change his own and escort's horses, and then rode on to Thal-Chotiali to give orders to the troops encamped there. Our interest was naturally aroused by this sudden arrival and departure in the dark, but we junior officers knew no details for a day or two. This ride of Lieutenant Jennings was no mean feat. My own experience of long-distance riding came a year later, when I rode, in June-July 1881, from the Persian Gulf to the Caspian. We averaged 65 to 70 miles a day on that ride, the longest spell being 106. Weather, roads, and condition of animals have to be considered. Sometimes we had to drive our post-horses before us for the last few miles of the stage.

The relief of Kandahar by Sir Frederick Roberts on the 1st September 1880 is a landmark not only in the history of that great soldier's career, but also in that of the Empire. Sir Robert Phayre, starting concurrently from Quetta, had to contend with even greater difficulties than Sir Frederick. To the ordeal through which the reinforcements

from India passed in Upper Sind and the Bolan Pass I have already referred. If munitions and food supplies are more or less impervious to heat, the transport and escorts are not. However, to be brief, as August drew on, the camp of Phayre's Division was a conspicuous mark on the lower slopes of the Kozhak range, noteworthy for its wild rhubarb, wild pistachio trees, and for an earthquake crack,[1] at least 100 miles long, of

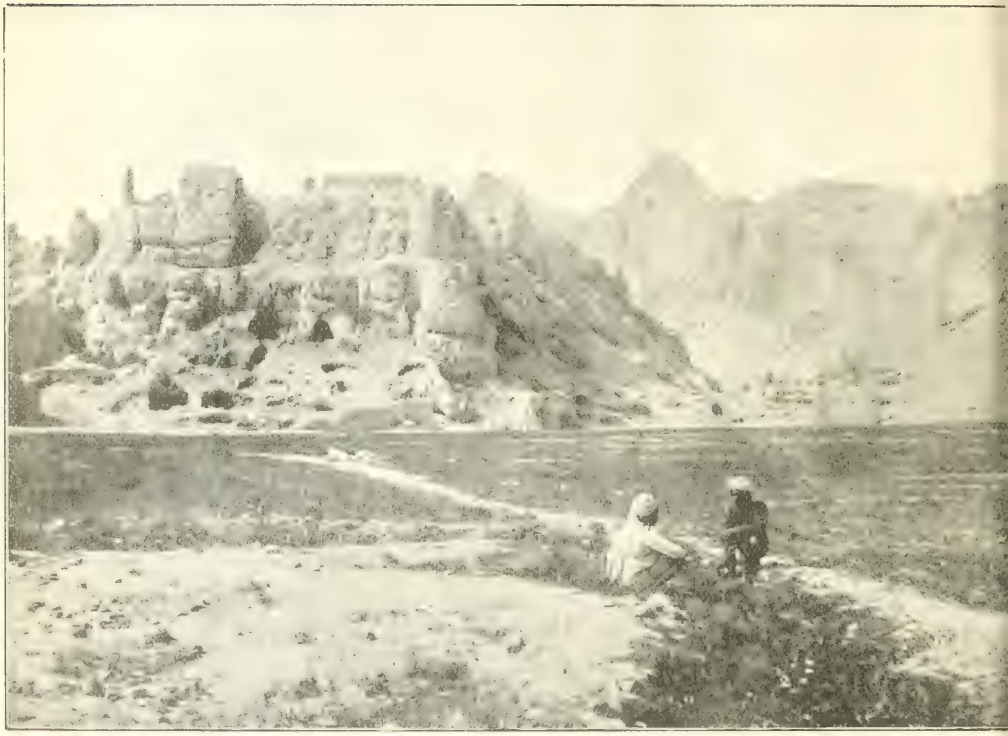

Fig. 1. Part of the Citadel of Old Kandahar in 1880. Gardens and fields in the foreground.
Photo by Surgeon-General Simpson.

which no one knows more than Sir Arthur Henry Macmahon, late High Commissioner in Egypt.

The water in 1880 between Quetta and Kandahar was mostly pernicious and medicinal, and of food for transport animals there was next to none. We left the Kozhak camp too late. When still three marches from Kandahar the news came that Sir Frederick Roberts had settled Ayub. That knocked the heart out of us, and when Phayre ordered us to march back whence we came, that was the last straw. And when we had gone back two marches we were told again to advance! Comment is superfluous. I only marvel that the transport

[1] See *Scottish Geographical Magazine*, March 1898, article on "Chaman," by Major A. C. Yate, p. 141.

animals lived. The Government of India decided that we had done nothing to deserve the "Star" for the relief of Kandahar. My eldest brother, then Captain C. E. Yate, Political Officer at Kalat-i-Ghilzai, sent a messenger through the mountains straight to Captain Henry Wyllie at Chaman, advising him of Roberts' approach. Wyllie showed me the letter in confidence, as being the writer's brother. I heard that Phayre discredited the report that Roberts was advancing so fast. Years afterwards I talked about this with Sir George White. He said, I well remember, "We looked upon Phayre as a formidable rival, and were very apprehensive that he would relieve Kandahar before we arrived." Would to heaven we had! When I think of that bare, barren, scorching plain below the Kozhak, whence our eyes looked out westward over that Registan, a sand-desert, which, prolonged into the Great Kavir, stretches away to Teheran: when I recall the saline and brackish waters, the sight of men and dogs burrowing for water in nullah-beds, our animals existing on next-to-nothing, and every native soldier on a pound of flour only a day: and when I try to picture what I did not experience, viz. the passage of troops from the plains of Upper, Central, or Western India to the Pishin, I need nothing more to tell me that Roberts' march from Kabul was child's play compared with what the troops under the very disappointing command of Sir Robert Phayre had to endure. I may add that there was one other force in Afghanistan, viz. the Kurram Valley Force, with which an effort to relieve Kandahar might have been made. Nay, more! I know, on the authority of one of the staff officers of that force, that such a movement was suggested and considered. The general officer in command decided not to attempt it.

The mind's eye sees so clearly before it the scenes of six-and-thirty years ago, the Harnai and Bolan routes, rugged but rejoicing in delicious water; the sounders of wild pig galloping from the fields in the vale up and over the hills, startled by the unwonted appearance of a long column of troops and transport: the broad view from the Kozhak over the Registan, and across the Kadanai valley, towards the Ghilzai mountains; and finally, the view from the old city of Kandahar, the old city that so stoutly resisted Nadir Shah, but never knew Ahmed Shah Abdali, the founder of the new city in 1753 and of the dynasty that died in the person of Lord Auckland's nominee for the throne of Kabul in 1838-41, Shah Shuja'-ud-daulah. Above that old city hangs a rocky ridge with a razor-edge, along which I remember my brother, a Political Officer under Sir Oliver St. John, walking. I had gone down to see the walled city below, and thence followed the foot of the ridge. Our field guns used to try their metal against those old mud walls. They made no impression, a gunner told me. My brother and I met finally at that lofty, almost precipitous flight of steps, known as Chihal-zina (forty steps) leading up to a grotto or shrine, the walls of which are inscribed with a narrative of Baber's campaigns. The north-east bastion of the old city, or rather its ruins, lay close to the Chihal-zina. The walk along the "razor-edge" had proved a ticklish bit of work. An excellent photograph of the Razor-edge ridge, the Chihal-zina, and the bastion, was taken by the late Surgeon-General Sir Benjamin Simpson, P.M.O. at Kandahar in

1880 (see Fig. 2). At a time when amateur photographers and kinematographers were less in evidence at the front than they are to-day, Surgeon-General Simpson's photographic skill was a public boon. In the first Afghan War of 1838-42 we are indebted to the fine volumes of pictures brought out by James Rattray, Sir Keith Jackson, James Atkinson and Lockyer Willis Hart for our knowledge of the war scenes of that period. The letterpress, too, supplies curious historical details which I have not come across in the conventional histories. We learn

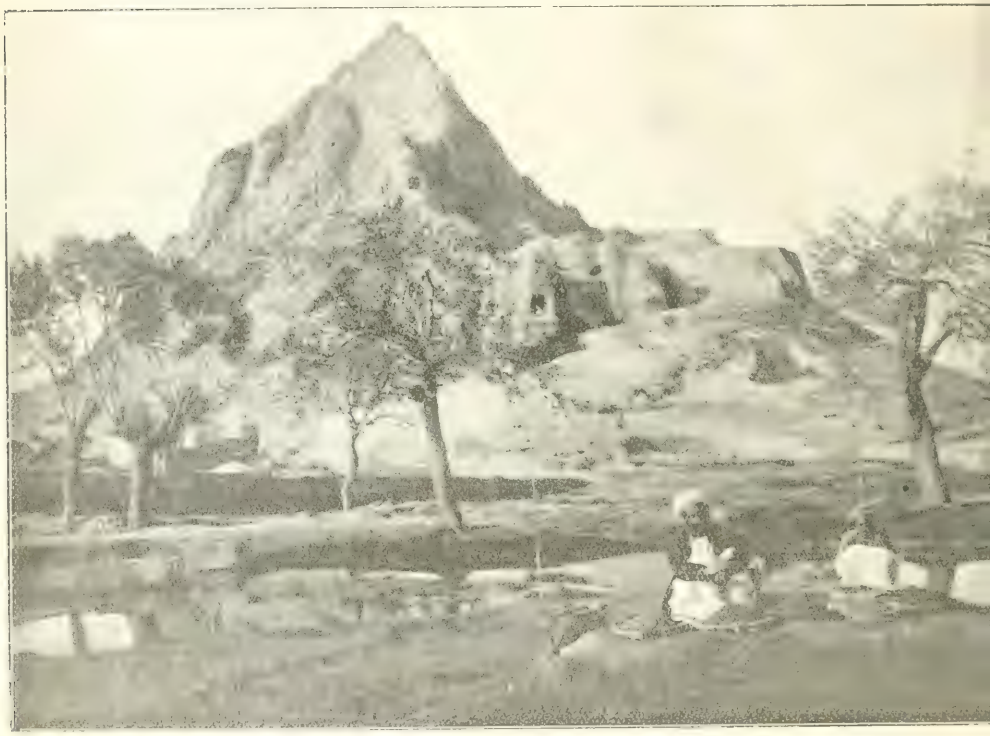

Fig. 2. The N.E. Bastion of Old Kandahar (to right), the Chihil-zina and the Razor edge ridge. The ridge shows traces of the old fortifications.—*Photo by Surgeon-General Simpson.*

from James Rattray that the remarkable rocky protuberance close to Kandahar (Fig. 3), which was known to the army of 1880 as "The Brigade-Major," was known to the army of occupation of 1840 as "The Bullock's Hump," and to him also we owe this story, at once romantic and pathetic, connected with the transfer of the Koh-i-Noor from the Crown of Kabul to that of Britain :—

"Many of these Afghan ladies have rendered their names celebrated in history by their conjugal attachment and devotion to the cause they supported. Among the heroines I may be allowed to mention one, the Wuffadar Begum (Faithful Queen), the favourite wife of Shauh-Shujau-

ool-moolk, who, during her exile at Lahore, saved, by her undaunted courage and determination, the famous diamond Coh-i-Noor (Mountain of Light) from the covetous grasp of Runjeet Sing, at the same time delivering herself from the advances, and her daughters from the 'Zunaun-Khana' (Haram) of the profligate monarch. Shauh Shujau, on his dethronement in 1809, contemplated throwing himself upon the mercy of his ancient foe (Runjeet), against the counsel of his faithful queen. He did so, however, in opposition to her sage advice, and was immediately imprisoned, barbarously insulted, and the Coh-i-Noor stolen

Fig. 3.—The Artillery Square within the enclosure of the Citadel of Kandahar in 1880. The Bullock's Hump appears in the background to right, and Ahmed Shah's mosque to left.—*Photo by Surgeon-General Simpson.*

by his treacherous host. Whereupon the Begum effected her escape in disguise to our provinces, made arrangements, by undermining the houses near his prison, for the rescue of the Shauh, laid horses on the road, and setting an example of coolness and intrepidity to those who aided her in the bold attempt to free the royal prisoner, completely succeeded in the project."

It will be noted that I have rigidly adhered to the spelling of names which was in vogue in the days of Mr. James Rattray. I understand that the famous traveller, Sir Alexander Burnes, the first victim of the Afghan rising in Kabul in 1841, has left a very appreciative record of "Wafadár Begum," but I have not been able to trace it. To complete

the story of the Kuh-i-Nur, the account of the presentation of that jewel by H.H. Prince Dhuleep Sing to Queen Victoria must be read in the Memoir of Lady Login,[1] which has very recently been published.

(*To be continued.*)

MR. FRESHFIELD ON THE CAUCASUS.

THE opening lecture of the session was delivered in Edinburgh on Thursday, November 9, by Mr. Douglas Freshfield, who spoke on "The Caucasus Mountains." At the beginning of the meeting Lord Guthrie, the President, presented Mr. Freshfield with the Livingstone Gold Medal, awarded to him by the Council on account of his distinguished services to geography in many ways, but above all in connection with mountain geography. In his reply Mr. Freshfield referred to his connection with the Royal Geographical Society in the promotion of geographical studies and education, and said that when he first joined the Council thirty-five years ago it seemed deplorable that they should have in Great Britain no geographical magazine to rival the German, and no maps such as the Swiss engineers were able to produce. On both of these points we had made most marked advances. There had also been a most substantial advance in geographical education. They had not only more capable teachers, but they had given a great impulse to the production of text-books and atlases. The name of Dr. J. G. Bartholomew, Hon. Secretary of the Royal Scottish Geographical Society, should be specially mentioned as one who had helped to stimulate the Ordnance Survey to new departures.

At the outset of his lecture Mr. Freshfield said that he was afraid he was there under false pretences that night, for he was sure that they all expected him to talk a great deal about one of the scenes of war. That was a mistake which was not quite his fault. It was partly the fault of the Russian Government and partly the fault of the newspapers. In fact the Caucasus had various significations. In its proper geographical signification it applied to the great chain which lay across the peninsula between the Caspian and Black Sea, but it was very often used for an administrative district of Russia, the Caucasian province, which extended widely both to the north and south of the chain, and which embraced in fact all Georgia and a great part of Armenia. The Russian Government described this war in their bulletins as the war on the Caucasian frontier, and that was true in so far as it was a war on the frontiers of Caucasia, but the war had really been carried on in Turkish Armenia. It was not his intention to talk in any detail about Turkish Armenia, because he had had only a bird's-eye view of it. In the year he went to the Caucasus he climbed the great height of Ararat and

[1] *Lady Login's Recollections, Court Life and Camp Life*, 1820-1904. By E. Dalhousie Login, 1916.

looked over that country. It was a vast table-land like Tibet, but on a smaller scale. There were no deep valleys. The general level might be about 5000 or 6000 feet, and the mountains were about 10,000 to 11,000 feet. The passes between them were more like some of the Highland passes than the great Swiss passes. The region was not good to fight in, but there was no comparison with that in which the Italians were so gallantly striving to drive the Austrians back.

The Caucasus chain was like the letter "Y," of which the fork rested on the Caspian Sea, while the long limb lay along the Black Sea coast. The whole of the country inside the fork was full of mountain gorges, mainly limestone, the home of tribes who fought for many years against the Russians.

Mr. Freshfield then showed a number of views of the central part of the range between Elbruz and the Darial Pass. When geographers, he pointed out, began to think about the Caucasus they concluded, very wrongly, that it was like the Pyrenees, one very narrow single chain, that it had few glaciers, and that there were two great volcanic peaks, and for the rest there were most absurd descriptions given. It was in 1868 that it first occurred to him that the Caucasus was a place worth exploring, and the best information he could get was from two Russo-Germans in the Russian service who had given him a certain amount of information which had filtered into Germany, but had not reached English geographers and cartographers. He made up his mind to go for the pass in the centre of the mountains, the only carriage pass, and turn west and work along the main chain. There were two big books that had dealt with the whole of the chain, one by a Hungarian and another by a German, which was typically German in its longwindedness and in the author's belief in his own superior accuracy. He could not praise altogether the article in the last *Encyclopædia Britannica* on the range. There were several details in it on which they must consult other works before they accepted them, particularly those in regard to glaciers. One of the mistakes about the Caucasus was that they had very few glaciers. They had the same area as Switzerland, about 650 square miles. The lecturer then described his journeyings in the region, of which he had an excellent series of limelight illustrations, showing peaks including Elbruz, Dykh-tau, Koshtan-tau and Ushba, with its two formidable summits and glaciers and other features, as well as members of the tribes with whom he had come in contact. From his store of experience and reminiscences Mr. Freshfield gave many interesting sketches of the region.

With regard to the future he said, in conclusion, that the country might come to have a substantial interest for British people. It ought to be added after the war to the playground of Europe. It was as accessible by way of Odessa as the Tyrol was fifty years ago. English travellers who went there would be heartily welcomed by the Russians, who had always been extremely kind to English travellers in the Caucasus. They lent him Government maps which were given only to military people and helped him in many ways. If these things were done then how much more might they look forward now to agreeable

relations and the strengthening of bonds of interest and affection between the two nations, which they all wished to have strengthened. He had had no time to speak of the Western Caucasus, where there was another eighty miles of practically unexplored mountains. From the physical geographer's point of view they had no adequate description of them. Any young men who wanted adventures and rough travel could have it to their hearts' content in the Caucasus.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Meeting of Council.

A Meeting of Council was held on the 30th October, when the undermentioned ladies and gentlemen were elected ordinary members of the Society :—

John Graham Dow.
George Hutcheon.
Ebenezer King.
Miss Macvicar.
John F. Stewart.
Captain E. K. B. Tighe.
J. R. S. Young.

Miss Bessie Slesser was elected an associate member.

Retirement of Dr. John Horne from the Chairmanship of Council.

The following resolution was unanimously adopted by the Council :—

"The Council desire to place on record the high appreciation of the value of the services rendered to the Society by Dr. John Horne, P.R.S.E., F.R.S. Dr. Horne has been an active member of Council since 1903. In 1911 he was elected Chairman of the Council, being the first to hold that office since the adoption of the present constitution of the Society.

"Dr. Horne has performed the duties of Chairman of Council with conspicuous ability and success. His constant urbanity, the ceaseless pains which he took to acquire a thorough knowledge of the questions brought before the Council, and his lucidity in stating them, have highly impressed the Council and greatly facilitated the transaction of their business.

"The Council desire still further to make their acknowledgment of Dr. Horne's services by recommending to the Society that he be elected, at next Annual Business Meeting, a Vice-President of the Society."

Annual Business Meeting.

The Annual Business Meeting was held on the 30th October in the Society's Rooms.

The meeting was at first presided over by Dr. Horne, Chairman of Council, who at once moved that the Hon. Lord Guthrie be elected

President of the Society for the session 1916-17 in succession to his Grace the Duke of Buccleuch, and that Col. Sir Duncan A. Johnston, R.E., K.C.M.G., C.B., be elected Chairman of Council. This motion being unanimously carried, Lord Guthrie took the chair, and on doing so expressed his high appreciation of the honour that had been conferred on him, and, assuring the members present of the great interest that he had always taken in the Society, spoke of the pleasure that it would give him to promote its well-being to the best of his capacity.

The Thirty-second Annual Report of the Council, which appears on pp. 587-592, was then summarised by the Secretary, who drew attention to the fact that the accounts showed a credit balance of upwards of £44 on the year's working. On the motion of Mr. H. M. Rush, seconded by Mr. J. G. Ferrier, the report was adopted.

Mr. James Cornwall and Mr. J. D. Monro were appointed Trustees of the Society, and Dr. John Gunn, M.A., Honorary Librarian.

The following members of Council who retire by rotation were re-elected:—W. B. Blaikie, LL.D.; John Mathieson, F.R.S.G.S.; T. S. Muir, F.R.S.G.S.; Colonel Wardlaw Ramsay; Colonel Sir P. Durham Trotter; Robert Blyth, C.A.; Robert Fullerton, M.D.; James MacLehose, LL.D.; J. B. Taylor; and Thomas Murdoch, J.P. Vacancies in the Council were filled by the election of W. S. Bruce, LL.D.; C. G. Cash, F.R.S.G.S.; Lionel Hinxman, B.A., F.R.S.E.; A. Crosbie Turner, F.R.S.G.S.; A. B. Gilroy; and Major W. H. Coltman.

Robert S. Allan, LL.D.; J. C. Buist; and the Very Rev. Sir G. Adam Smith, D.D., LL.D., were re-elected Chairmen of the Glasgow, Dundee, and Aberdeen Centres respectively.

Lectures in December.

Dr. W. S. Bruce will address the Society in Aberdeen and Dundee on the 5th and 6th December respectively. His subject will be "The Weddell Sea: A Study in the History of Antarctic Exploration." Professor J. W. Gregory, F.R.S., D.Sc., will lecture on "The Growth of the Map of the World" in Edinburgh and Glasgow on the 6th and 8th respectively. The lectures will be illustrated by lantern views.

GEOGRAPHICAL NOTES.

Europe.

The Dune Areas of France.—There are many indications in French scientific journals that preparations are already being made to repair the ravages of war by a fuller utilisation of the national resources. In this connection attention may be drawn to an interesting article by M. Dufrénoy, in the August issue of the *Revue Générale des Sciences*, which deals with methods of improving and rendering habitable the wind-swept coastal belt of France, which is, as is well known, remarkable for its great development of sand dunes. The effect of the wind on many

parts of the French coast is to give rise to conditions which are truly desertic in the total absence of plants, and, further, this strip of desert is a danger to the cultivated lands further inland, for these are continually tending to be overwhelmed by the drifting sand. The author points out that wind-swept surfaces become sterile, for the particles of humus are continually being carried away by the wind, while the mobility of the particles also prevents plant growth, and the driving effect of the wind is such as to form a hard crust on the surface, which is resistant to the passage of rain. With the aridity of the surface are also associated great temperature variations, which are very unfavourable to plant life. In winter the snow is removed as it falls, and thus the soil becomes excessively cold, while in summer, owing to its dryness, it heats up with great rapidity in the sun. In the Landes region it has been found that there is a temperature range of from 10° F. in winter to 100° F. in summer, so that the region is a hot desert in summer and a cold desert in winter. M. Dufrénoy's paper, which is copiously illustrated and contains some striking diagrams, gives accounts of the plants used in dune-planting and of the methods adopted to obtain the necessary shelter for the fish-reservoirs in the Vendée and the Arcachon region, and also for the maritime pine forests of Gascony. He makes also suggestions for the establishment of "colonies" on the various sand dune areas of France in regions which are at present deserted, where groups of people could be established, and could find behind the necessary shelter-belts lands capable of cultivation, which would supplement the fishing industry. He believes that such colonies would help to solve the problem of local over-population observable in Lower Brittany, and would enable the people to live under better conditions than at present.

Human Geography of the French Riviera.—Mlle. Myriem Foncin contributes to the July issue of the *Annales de Géographie* an exceedingly interesting article on the cultivation of early flowers, fruits, and vegetables along the French Riviera from Toulon to Mentone, and on the effects of the new industry on the life of the people. She points out, in the first place, that though the whole coastal belt from Toulon to the Italian frontier presents a remarkable unity of economic life, yet this is not due to a similarity of soil or relief. Both vary greatly, but the unifying element is found in the climate, which is typically Mediterranean, and virtually identical throughout the whole stretch. From the point of plant life, the important features are the summer drought, which can be tolerated only by the vine, wheat, and fruit trees, and the torrential autumn rains, which begin at the end of September and last till the beginning of November. These are called the Michaelmas rains by the peasants, because they begin about Michaelmas day (September 29), and they lead to a sudden revival of growth among the plants which have been dormant during the drought of summer. The winter months are marked by heavy showers, but not by continuous rain. As the temperature begins to rise in February and March the precipitation is again very heavy, and leads to the unfolding of a vast number of flowers, which are soon withered by the heat of May. Thus hardy

plants, especially flowers and vegetables, if sown at the time of the September rains, will come to maturity in the winter and early spring months, at the time when crops further north are just being sown. Those facts form the climatic basis of the market-gardening industry of the Riviera, of whose development and present extension the author gives a most instructive account.

There are at present two areas of maximum production, one in the fertile plain of Hyères where early vegetables are extensively grown, as well as flowers, and one between Cannes, Grasse, Vence, Cattières, and Nice, where flowers only are cultivated. The two areas are connected by a narrow interrupted strip in which, from a variety of causes, the market-gardening industry is only carried on on a small scale, and only where the local conditions are specially favourable. It is to be noted that among the favouring conditions easy access to the railway line counts for much, for it is essential that the distant market be reached with great rapidity.

Sixty years ago the people of the area under consideration produced practically nothing except wheat, olives, and grapes. Wheat has almost disappeared, olives are diminishing: only the vine remains of the original triad, and it demands attention precisely in that summer season which is the dead period for market-gardening. The change in the character of the cultivated plants has been rapid, and Mlle. Foncon indicates in a very interesting way the stages by which it has been accomplished. She notes first the peculiarities of the Mediterranean flora, and the fact that the beauty of many of the wild plants leads to a fairly active trade in wild-flowers, especially heaths, daisies, and arbutus flowers, as well as ferns. These are gathered by "pauvres gens sans métier défini," much as in other countries, if on a larger scale. But such wild-flower gatherers, while roaming in the forests of the Maures mountains, often come across sheltered nooks well adapted for flower cultivation. In these mountains, therefore, and there only, little clearings are to be found, the large proprietors being willing to grant short leases to the flower gatherers, sometimes for a small quit rent, sometimes merely to get the land cleared. Small family groups clear a patch, stir the surface slightly, and sow some cheap seed, generally of the grass which, dyed in vivid colours, is so largely exported. They take off a crop for a year or two till the ground becomes exhausted, and then abandon the plot and clear another. This may be regarded as the first stage. In the next stage proprietors are found who are too conservative to give up their original cultivated plants, but who put in flowers and vegetables between the olives and vines. The vines and olives remain the important crops, and no hired labour is employed, the women and children doing much of the work connected with the market garden plants. In the next stage vine and olive are abandoned, hired labour is employed, though the employés are treated as members of the family, and the cultivation, pulling, packing, and despatching of fruits and flowers is undertaken with great seriousness. The last stage is the horticultural establishment proper. Here the proprietor is a stranger to the district, many being wealthy retired business men or naval officers. A large staff is kept, and usually only one or two

kinds of plants are grown, for instance roses and carnations. Here the plants are mostly grown under glass, and all the resources of modern science are utilised.

The development of the trade in early flowers, fruit, and vegetables has been closely related to the great development of railway facilities, and it is of interest to note that, with the exception of Lyons, which is on the main route, and some other towns similarly placed, the produce goes either direct to Paris or to foreign countries; it does not supply France generally. Of foreign countries the British Islands, Belgium, and Germany took almost equal amounts of Riviera produce before the war, but there was considerable difference in the articles sent to the respective countries, Germany taking vegetables, especially salads, England fruits and some flowers, Belgium vegetables. The competition of the cheap produce of the glasshouses of Belgium and Germany seemed before the war to be leading to the Riviera growers specialising in the more costly vegetables and flowers, instead of attempting to increase the output of the cheaper varieties.

One of the minor results of the development of market gardening has been a change in the distribution of the population. Formerly the people were congregated in villages and towns on the hills, but the hill villages are tending to be deserted for new scattered dwellings among the gardens, for these may require attention during the night if frost threatens, and work begins at dawn. Again, the composition of the population is changing, for, in the absence of a local labour supply, Italian labourers are hired by those who engage in cultivation on a considerable scale, the work being eminently labour-absorbing. The Italians rarely inter-marry with the French population, but as they prosper they often return to their own country to marry and bring their wives back with them to France. Their children may become French soldiers. It is noted that the relatively low standard of life among the Italians enables them to acquire a little capital very speedily, and their business instincts are also a factor in their success. They are now in process of acquiring control of all the petty commerce of the region. Finally, it may be noted that the annual value of the fruits, flowers, and vegetables exported from the area is nearly 2½ million pounds, and that the industry is modifying greatly the life of the people, and is leading to the loss of many old customs, and to a greatly increased desire for education as a means of prospering in a very complex form of trade.

War and Geography in the Balkans.—In continuation of his studies of the influence of geographical conditions upon the course of the war, Dr. Douglas Wilson Johnson contributes to the *Geographical Review* for July a long article on the Balkan campaign, in which he gives an account of the geography of the peninsula and of the course of the war there up to the period when the Allied armies retired on Salonika. The article does not seem to contain anything which is definitely new, but is of interest as summarising the events of the campaign in relation to the physical peculiarities of the peninsula.

AFRICA.

The Tanganyika-Nile Rift Valley.—In the August number of the *Geographical Journal* Capt. Stigand gives a description of the northern end of the Tanganyika-Nile Rift Valley from Rejaf to Lake Albert, and on the basis of his observations makes an interesting suggestion as to the former course of the Nile. He believes that the Murchison Falls of the Victoria Nile are due to displacement along the line of the strike fault which bounds Lake Albert to the east. Prior to the faulting he holds that the Victoria Nile flowed westward at a higher level than at present. The obstruction due to the dislocation caused the river to form Lake Albert, and then to turn northward along the base of the escarpment which forms the western boundary of the Rift Valley, to seek an outlet in that direction. He believes that before the origin of the Rift Valley the westward course may have been continued to the site of the present Mahagi, and that then the river ran north-westward, perhaps between Darfur and Wadai, was continued into the Wadi-el-Fardi, perhaps receiving from Lake Chad a tributary in the form of the Bahr-el-Ghazal, and finally reached the sea near Tripoli. Mr. Arthur Holmes follows with a short paper in which he discusses Capt. Stigand's suggestions, and points out that, according to Mr. Cana, the Wadi-el-Fardi may have reached the existing Nile near the head of the delta, which would give the old Nile a somewhat different course from that which Capt. Stigand puts forward. Another possibility is that the Wadi Hower may represent the former course of the Nile. His general conclusion, however, is that the subject can hardly be profitably discussed at present, until the Wadi-el-Fardi and the Wadi Hower have been more fully explored. His paper gives historical notes on the various hypotheses which have been put forward by different authors on the former course of the Nile prior to the formation of the Rift, and indicates in detail the directions in which further information must be sought before the many difficult questions connected with the Rift can be solved. Both papers are fully illustrated by sketch-maps and diagrams and form an important contribution to an interesting and difficult subject.

EDUCATIONAL.

Geography at London University.—According to a note in the November issue of the *Geographical Journal*, the University of London has recently instituted a diploma in geography, which it is hoped will take a recognised place as marking a high standard of knowledge in the subject being regarded as equivalent to an honours degree in one subject. Especial stress is laid on the physical basis of geography, which is taken to include the elements of physical geology, geomorphology, and meteorology. The examination will also test the knowledge of the candidates in the use of instruments and in map-making and reading, as well as in general, regional, and historical geography. The first examination for the diploma was held last July, when four candidates offered themselves, all of whom passed.

NEW BOOKS.

EUROPE.

The Geology of the Lake District, and the Scenery as Influenced by Geological Structure. By J. E. Marr, Sc.D., F.R.S. Cambridge: at the University Press, 1916. *Price* 12*s. net.*

No one, perhaps, knows the complex geology of the Lake District so intimately as Dr. Marr, and he has given us a delightful volume, which will be welcomed alike by geologists and geographers. The earlier chapters deal with the stratigraphy of the older Palæozoic rocks, the conditions under which they were deposited, and the changes superinduced in them by crustal movements and igneous intrusion at the close of Lower Palæozoic times. In succeeding chapters the author discusses the characters of the Carboniferous, Permian, and Triassic rocks, the possibility of a former greater extension of Permo-triassic and later rocks over the Lake District, and the production, probably in Tertiary times, of a dome-shaped region of uplift, with consequent radial drainage.

To geographical readers the last six chapters, which deal largely with the development of the topography of the district, will prove of supreme interest. Dr. Marr describes and compares the types of scenery produced in the Skiddaw Slates, the Borrowdale Series, and the Silurian rocks; he indicates the influence on the scenery of the more resistant intrusive masses, such as Carrock Fell, and the subsidiary features dependent on the presence of dykes and shatter belts; and he portrays graphically the "desk structure" so characteristic of the tracts occupied by rocks of Carboniferous age. He adduces, moreover, evidence to show that before the glacial period the hills of the Lake District were in a state of subdued relief.

In dealing with the changes superinduced during the Great Ice Age the author shows clearly that he regards moving ice as a powerful agent of erosion. The rounding off of minor irregularities of surface and the production of *roches moutonnées* are quite subsidiary to the extensive widening and deepening of the valleys in the upland regions, which resulted in profound modifications of the topography. Particular instances are cited, and admirably illustrated by photographs of truncation of spurs, hanging valleys, combes, and asymmetric ridges, such as those of the Helvellyn range. The larger lakes are regarded as essentially rock basins, as advocated by Clifton Ward, although in some cases, *e.g.* Windermere, the surface waters are held up by glacial accumulations. Monotonous features result where, as in Matterdale Common, there is an extensive tract of the boulder clay of the maximum glaciation; the scenic effects of the moraines of the later glaciation are described as interesting rather than beautiful.

Dr. Marr points out that, apart from the detailed study in the extreme south-east of the district by Bernard Smith, the glacial overflow valleys still await systematic examination, and the interesting examples quoted by the author show that there is here a most promising field for research.

"The effects of glaciation were to produce great changes in the topography of an area which had attained the condition of subdued relief, and one of the principal changes due to erosion was the steepening of valley sides and heads which were thus converted into a state of unstable equilibrium as regards the ordinary erosive agents of the weather and running water." In the concluding chapter the author discusses the effects produced on the scenery by the accumulation in post-glacial times of such disintegrated material as screes, landslips, dry deltas,

corroms, snow-slope detritus, rain wash, and alluvial deposits of rivers, lakes, and estuaries.

The volume is well illustrated by numerous sketch-maps, sections, and half-tone photographs in the text, and contained in a pocket in the cover is an excellent coloured geological map, on the scale of 4 miles to 1 inch, by Dr. H. H. Thomas.

The Soul of the Russian. By MARJORIE LETHBRIDGE and ALAN LETHBRIDGE. London: John Lane, 1916. *Price* 3*s.* 6*d. net.*

At the present moment many authorities are urging the people of this country to look to Russia for enlightenment, just as some years ago the same authorities proclaimed that wisdom resided in the West, and railway managers and others were sent to search for it in the United States. Possibly in this case second thoughts are best, or possibly each course had its justification at the time. In any case, it is well that we should know more of our great Ally in the East, and such a book as this performs a useful office.

The most interesting chapter is certainly that in which the future of Siberia is forecasted. The authors look forward boldly to the possibility of its outstripping Canada, its climatic prototype, in productivity. Siberia, through the centuries, has borne an evil reputation, but with fuller knowledge that is passing away. It was only in the last decade of last century that the Russian Government awoke to its potentialities, and the Siberian Railway was built. Then followed the wider acquaintance that came with the Japanese War, and the period of assisted immigration, which was not very successful. But the real awakening has its origin in the present war. When that was declared Siberia suddenly realised itself. The war against Germany was popular, but when prisoners began to arrive in their thousands they were treated with the kindliness which is innate in the *moujik*. Gradually it was found that the newcomers—Poles, Ruthenians, Slovaks—were of kindred race. They were welcomed for themselves. After the war they will become settlers, and will attract others of their kin. Moreover, they supply just the industrial element that the country needs. The problem of population is in the act of being solved—thanks to the Kaiser—and the vast mineral and agricultural wealth of the land will be realised.

As the title of the book indicates, it is the Russian himself that the writers have chiefly in view, and the short, brightly written chapters tell of many typical figures, past and present, humble and heroic. They were greatly attracted to the Russian people by their residence and journeys amongst them, and have many amusing and interesting tales to tell of their experiences. Every here and there there crops up the latent detestation of Germany, under whose yoke the country has groaned for centuries; it has now finally thrown off this burden.

Summer Holidays in the Alps, 1898-1914. By W. E. DURHAM, Rector of Newton Abbot, Prebendary of Exeter, Member of the Alpine Club. With 57 Illustrations. London: T. Fisher Unwin, Ltd., 1916. *Price* 15*s. net.*

Every lover of the Alps will bless the author of this book. It is not that he specialises in hairbreadth escapes, although one or two are near enough, nor does he indulge in wordy rhapsodies, or literary allusions, or scientific theories, all of which are in moderation pleasant in their way, but he gives a plain, almost unvarnished account of a series of summer vacations in the most charming of all playgrounds. Any one can see that he loves the mountains without his requiring to say so on every other page. His mental attitude is truly British, or rather Anglo-Saxon, and a striking contrast to that of our Latin friends. These are

sprightly fellows, who delight in displaying their feelings in a flow of highly picturesque and carefully studied language, agreeable when one is in a certain mood, but Mr. Durham's is the book for ordinary wear. His mountaineering life, so far, happens to coincide with the reviewer's, which has lent a peculiar and intimate interest to the perusal of his pages. It is especially pleasant to observe his habit of revisiting—in some cases several times—favourite summits. His experience of the Dent du Midi was unfortunate, but is not uncommon. Yet in fine weather the view from any of the "teeth" is of striking and varied beauty, and the climbing, on two of them, is of a fairly high standard. Mr. Durham seems to have climbed comparatively little without guides, and there is no doubt that, with the possible exception of very severe courses, most ascents seem much easier to one who follows a guide than to one who relies upon himself or on amateur companions. The illustrations are well-chosen and beautifully reproduced.

British Rainfall, 1915. By Hugh Robert Mill, Director, and Carle Salter, Assistant Director. Fifty-fifth Annual Volume. With Maps and Illustrations. London: Edward Stanford, 1916. *Price* 10*s*.

In spite of the stress due to war conditions, *British Rainfall* appeared promptly and with only a slight reduction in size. As frontispiece the present issue has a very fine coloured map, showing the average rainfall of the Forth valley. The map extends eastward to Leith and Burntisland, and is orographically coloured, contours being drawn at 200, 400, 600, 1000, 1500, and 2000 feet. On this orographical map isohyets are superimposed, while the actual annual rainfall is shown in figures for every place where a rain gauge has been in use for a sufficient period to give reliable results. The colouring of the map is well done, in shades of brown and green, and it affords an admirable picture of the region both from the point of view of relief and of rainfall. The very limited area which has a rainfall of less than 30 inches is interesting. The isohyetal line of 30 inches runs along the south coast of the Firth of Forth from Edinburgh, crosses the river about two miles below Alloa, and returns parallel to the northern shore. The result is that a belt near Edinburgh, a considerable part of the Almond valley, and a small coastal strip westward of this, on both shores of the Firth, have the limited rainfall, the land included being almost everywhere below 200 feet in height. Elsewhere precipitation everywhere, broadly speaking, increases with height, but the same rainfall is found at lower altitudes in the west than in the east, and narrow valleys, especially those running at right angles to the prevailing wind, share the high rainfall of the mountain slopes which surround them. In other words, the rainfall of the area depends upon exposure to the prevailing westerly wind and upon altitude. The greater part of the area has an average rainfall lying between 30 and 60 inches, thus constituting two-thirds of the total, but in the high ground to the north-west the average exceeds 100 inches, and in small areas even 110 inches. The general rainfall of the whole valley is 30·5 inches.

Apart from the map just described and the accompanying article, the volume shows the usual features with but minor variations.

ASIA.

The Archæology of the Holy Land. By P. S. P. Handcock. London: T. Fisher Unwin, 1916. *Price* 10*s*. 6*d*. *net*.

In this volume the author gives a summary account of the arts, crafts, manners and customs of the inhabitants of Palestine, from the earliest times down to the

Roman period, in so far as these can be deduced from an examination of the results of excavation. He does not, that is to say, attempt to correlate and explain the archæological finds by reference to what is known of the history, climate, social and economic conditions, and so far forth of the Palestine of the period concerned, but confines himself to descriptions of the caves, dwellings, implements, weapons, pottery, burial-places and places of worship, as laid bare by the industry of the excavators, especially of Professor R. H. S. Macalister, whose monumental work, *Excavation of Gezer*, is constantly referred to. The result is a volume for the student—to whom it will be most valuable—rather than for the general reader, who will obtain chiefly an impression of poverty of means and of invention on the part of the inhabitants of what Mr. Henderson calls "a petty buffer state." At all stages these inhabitants seem to have been dependent upon foreign countries either for inspiration or for models in the case of any article or utensil of daily life which rose at all above the simplest level, and there is little evidence of originality in modifying or improving the foreign models. The originality of the people of Palestine, that is to say, took other forms than that of art. The book is copiously illustrated, and, as we have said, will be invaluable to the student.

EDUCATIONAL.

Essentials of Geography. By Albert Perry Brigham, A.M., and Charles T. M'Farlane, Ph.D. First Book. *Price* 3*s*. Second Book. *Price* 5*s*. New York: American Book Company, 1916.

In the preface to the first of the above books the authors postulate three things as being of first importance in elementary textbooks of Geography: "That the facts and principles selected shall be the essentials of our knowledge of the earth; that they be within the understanding of the young, and that they be set forth in an interesting manner." No one will dispute these contentions, and a perusal of the volumes, the second of which covers the ground of the first in greater detail and more advanced style, convinces us that these aims have been steadily and successfully kept in view.

As is to be expected, the United States of America are studied very fully, especially from the human side of geography, to illustrate the authors' method of working, and this probably accounts for a lack of proportion in both books. The utmost pains have been taken to illustrate the matter in a useful and interesting way, admirable photographs illustrating man's environment and his various activities being liberally supplied. The maps deserve commendation. By way of appendices, accounts of important products and tables giving useful information on a variety of subjects are added. A good feature is the attention paid to the revision of points treated in the various chapters.

Statements requiring modification are to be found in the Second Book. On page 272 Scotland is credited with raising flax; on page 415 Canada's railroad mileage is quoted as 29,304, the fact being that in 1915 that country had over 40,000 miles of railway in operation.

The books are thoroughly up to date in spirit, and the authors are to be congratulated on their attempt to prove to their readers that geography, far from being a dry-as-dust subject, is a living and progressive study of man's relation to his fellow-creatures and his surroundings.

BOOKS RECEIVED.

The Founding of Spanish California: The North-westward Expansion of New Spain, 1687-1783. By CHARLES EDWARD CHAPMAN, Ph.D. Demy 8vo. Pp. xxxii + 485. *Price* 15*s. net.* New York: The Macmillan Company, 1916.

The Gate of Asia: A Journey from the Persian Gulf to the Black Sea. By WILLIAM WARFIELD. With 48 Illustrations. Demy 8vo. Pp. x + 374. *Price* 10*s.* 6*d. net.* London: G. P. Putnam's Sons, 1916.

The Lost Cities of Ceylon. By G. E. MITTON. With Illustrations and Maps. Demy 8vo. Pp. xv + 256. *Price* 10*s.* 6*d. net.* London: John Murray, 1916.

A Nursery Geography. By GEORGE S. DICKSON. Illustrated by GEORGE MORROW. Medium 8vo. Pp. vi + 256. *Price* 3*s.* 6*d. net.* London: T. C. and E. C. Jack, 1916.

A Hausa Botanical Vocabulary. By JOHN M. DALZIEL, M.D., B.Sc., D.T.M. Demy 8vo. Pp. 119. *Price* 6*s.* 6*d. net.* London: T. Fisher Unwin, Ltd., 1916.

David Thompson's Narrative of his Explorations in Western America, 1784-1812. Edited by J. B. TYRRELL. Medium 8vo. Pp. xcviii + 582. Toronto: The Champlain Society, 1916.

The True History of the Conquest of New Spain. By GENARO GARCIA. Translated by ALFRED P. MAUDSLAY, M.A., D.Sc. Demy 8vo. Vol. v. Pp. xiv + 463. London: Printed for the Hakluyt Society, 1916.

Sinhalese Self-Taught. By Don M. de N. WICKREMASINGHE. Crown 8vo. Pp. 119. *Price* 2*s. net.* London: E. Marlborough and Co., 1916.

The Punjab, North-West Frontier Province and Kashmir. By Sir JAMES DOUIE, M.A., K.C.S.I. Demy 8vo. Pp. xiv + 373. *Price* 6*s. net.* Cambridge: University Press, 1916.

The World we Live In. Vol. III. Edited by GRAEME WILLIAMS, F.R.G.S., F.G.S., F.Z.S. With an Introduction by LIONEL W. LYDE, M.A., F.R.G.S. Imperial 8vo. Pp. 231. London: The Waverley Book Co., Ltd., 1916.

The Geography and Geology of West Central Sinai. By JOHN BALL, D.Sc. *Price* P.T. 30. Cairo: Government Press, 1916.

Le Climat de la France. Température Pression, Vents. Par G. BIGOURDAN. Paris: Gauthier-Villars et Cie, 1916.

The Mechanical Star-Bearing Finder: A Simple Guide to Night-Marching in Southern England and North France. By E. T. GOLDSMITH, R.N. *Price* 5*s. net.* London: George Philip and Son, Ltd., 1916.

Philip's New Pocket Planisphere (5-inch diameter). Northern Hemisphere. Stout Card Disc, black leatherette hour circle stamped gilt. *Price* 1*s.* 6*d. net.* London: George Philip and Son, Ltd., 1916.

Bolivia: the Heart of a Continent. Prepared for the Bolivian Legation by WM. A. REID. Pp. 53. Washington, 1916.

Notes on the Geology of Nelson and Hayes Rivers. By J. B. TYRRELL, M.A., F.R.S.C. Pp. 27. Ottawa: Printed for the Royal Society of Canada, 1916.

The Work of the Wind in warming a Lake. By EDWARD A. BIRGE. Reprinted from the Transactions of the Wisconsin Academy of Sciences, Arts and Letters, vol. xviii. part ii. 1916.

The Geographical Foundation of Turkey's World Relation. By LEON DOMINIAN. From the Journal of the American Oriental Society, vol. xxxvi., 1916, pp. 168-180.

The Athabasca River Country. Department of the Interior, Canada, 1916.

Handbooks for the Indian Army. Gurkhas. Compiled under the orders of the Government of India by Lieut.-Col. EDEN VANSITTART. Revised by Major B. U. NICOLAY. Pp. 231. *Price R.* 1, *annas* 8. Calcutta, 1915.

Colonial Reports, Annual.—Hong Kong (892); Ashanti (893); Gold Coast (894); Malta (895); St. Helena (896); Seychelles (897); Bechuanaland Protectorate (898); Gibraltar (899); Bahamas (900); Swaziland (901); Somaliland (902); Cyprus (903); Ceylon (904); Straits Settlements (905); Grenada (906).

Annual Report of the Under-Secretary for Mines, Queensland, 1916.

Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions, 1915.

The Twenty-Ninth Annual Report of the Bureau of American Ethnology, 1907-1908. Washington, 1916.

Thirtieth Annual Report of the Bureau of American Ethnology, 1908-1909. Washington, 1916.

British Guiana Blue Book, 1915. Demerara, 1916.

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

NEW MAPS.

EUROPE.

ORDNANCE SURVEY OF SCOTLAND.—The following publications were issued from 1st January to 31st March 1916:—

Six-inch and larger Scale Maps. Six-inch Maps (revised).—Quarter-sheets, with contours in red. Price 1s. each. *Renfrewshire.*—7 NE.

1 : 2500 Scale Maps (revised), with houses stippled and with areas. Price 3s. each. *Dumbartonshire* (Det.).—Sheets XXXIV. 3, 4. *Linlithgowshire.*—Sheets III. 3, 4, 7, 11, 15, 16; IV. 7, 8, 9, 13; V. 13, 14; VI. 12, 14, 15; VII. 2, 6, 7, 8, 10, 11, 13; VIII. 2, 4, 5, 11, 13; X. 3, 6; XI. 3, 5, 7, 9. Sheets XI. 16; XIV. 2. Price 1s. 6d. each. *Stirlingshire.*—Sheets XVIII. 9; XXIV. 9; XXXI. 7, 9, 11; XXXIV. 4; XXXV. 10, 12, 13, 14, 15; XXXVI. 2.

Note.—There are no coloured editions of these Sheets, and the unrevised impressions have been withdrawn from sale.

GEOLOGICAL SURVEY OF SCOTLAND.—The following publication was issued from 1st to 30th September 1916:—

Memoirs of the Geological Survey. The geology of Ben Nevis and Glen Coe, and the surrounding country. (Explanation of Sheet 53). By E. B. Bailey, B.A., and H. B. Maufe, M.A.; with contributions by C. T. Clough, M.A., J. S. Grant Wilson, G. W. Grabham, M.A., H. Kynaston, B.A., W. B. Wright, B.A., 1916. Price 7s. 6d.

Note.—Pressure of work due to the war has delayed the colour-printing of the one-inch map, of which this memoir furnishes a description. The map will be issued at the earliest possible date.

BACON'S COMMERCIAL MAP OF GREAT BRITAIN.—Showing all Railways and Stations, Canals, Navigable Rivers, Main Roads, and Steamship Routes. Scale 1 : 54,400 or $8\frac{3}{4}$ miles to 1 inch. 1916. Price 21s.

G. W. Bacon and Co., Ltd., London.

INTERNATIONAL MAP.—Scale 1 : 1,000,000. Compiled at the Royal Geographical Section, General Staff. Drawn and printed at the Ordnance Survey Office, 1916. Price 1s. net each sheet.

Amsterdam, Provisional Edition, North N-31.
Firenze, „ „ „ K-32.
Milano, „ „ „ L-32. (*With contours.*)
Smolensk, „ „ „ N-36.

Geographical Section, General Staff, London.

ASIA.

INTERNATIONAL MAP.—Scale 1 : 1,000,000. Compiled at the Royal Geographical Society under the direction of the Geographical Section of the General Staff, 1916. Price 1s. net.

Tiflis, Provisional Edition, North K-38.

Geographical Section, General Staff, London.

AFRICA.

CONQUERED SOUTH-WEST AFRICA. Area 322,450 square miles.
„ **EAST AFRICA.** „ 384,318 „ „

Published by authority, 1916. *Offices of "South Africa," London.*

NIGERIA.—Scale 1:125,000. Sheet North—B-32 ; N-III. Coloured contours, showing roads, woods, and areas under cultivation, etc. Price 1s. 6d.

Published by the authority of Sir Frederick Lugard, G.C.M.G., C.B., D.S.O., Governor, under the direction of Major F. G. Guggisberg, C.M.G., R.E., Director of Surveys, Southern Nigeria.

AMERICA.

UNITED STATES SURVEY.—Topographic Sheets issued 1915-16, on various scales. The figures after the name of each State indicate the number of sheets received. Price 10 cents. each sheet.

Scale 1 : 125,000, or about 2 miles to an inch :—

California, 3 ; Hawaii, 2 ; Idaho-Wyoming, 1 ; Illinois, 2 ; Illinois-Iowa, 1 ; Kentucky-Virginia, 1 ; Kentucky, 1 ; Minnesota, 1 ; Missouri, 1 ; Montana, 1 ; New York, 2 ; N. Carolina, 1 ; Ohio, 8 ; Oregon, 1 ; Tennessee, 1 ; Texas, 2 ; Vermont, 1 ; Virginia, 2 ; W. Virginia, 1 ; Wyoming, 1.

Scale 1 : 31,680, or about 2 inches to a mile :—California, 12.
Scale 1 : 30,000, „ $2\frac{1}{10}$ „ „ Nevada, 1.
Scale 1 : 24,000, „ $2\frac{1}{2}$ „ „ Nevada, 1.

United States Geological Survey, Washington, D.C.

MAP OF MANITOBA, SASKATCHEWAN, AND ALBERTA, showing the number of quarter sections available for homestead entry in each township, also the pre-emption of purchased homestead area as defined by the Dominion Lands Act, 1906.

Scale 35 miles to 1 inch. 5th edition.

Department of the Interior, Canada, 1916.

CHARTS.

ADMIRALTY CHART.—Arctic Sea, Baffin Bay. Corrections to 1876. No. 2177. Showing the outward and homeward journey of the *Pandora*, 1853. London.

CIRCUMPOLAR CHART.—Western Half. Showing the region discovered by English Arctic Expeditions, also entire outward and homeward voyage of the *Pandora*. London.

Presented to the Society by the Royal Geographical Society, being half of a gift of maps from the executors of the late Sir Allen Young.

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

REPORT OF COUNCIL.

THIRTY-SECOND SESSION, 1915-1916.

(*1st October* 1915 *to* 30*th September* 1916.)

The Council have the honour to submit the following Report:—

ORDINARY MEMBERSHIP.

The changes which occurred during the Session in the number of members were as follows:—

Number on 1st October 1915,		1662
New Members added,		12
		1674
Deduct by Death,	46	
,, Resignation,	141	
,, Arrears,	16	
		203
Number of ordinary members remaining on roll on 1st October 1916,		1471

Of this number, 748 are on the Edinburgh list, 367 on the Glasgow list, 145 and 94 on the Dundee and Aberdeen lists respectively. In addition to those on the lists named, 33 members reside abroad, and 84 reside in England. The number of life members in the total given above is 199.

TEACHER ASSOCIATE MEMBERS.

Number on 1st October 1915,		177
New Members added,		10
		187
Deduct by Resignation,	28	
,, Arrears,	4	
		32
Number of Teacher Associates remaining on roll on 1st October 1916,		155

The number of Associate Members at the various centres is as follows:—Edinburgh, 59; Glasgow, 63; Dundee, 4; Aberdeen, 16. In addition 12 reside in England and 1 abroad.

Fellows.

There are at present five Honorary Members, thirty-nine Honorary Fellows, and eighty-seven Ordinary Fellows of the Society.

Corresponding Members.

The honorary corresponding members of the Society now number forty-one.

Meetings of the Society.

The Society's Anniversary Meeting was addressed by Dr. J. Scott Keltie, F.R.G.S., F.S.S., F.S.A.(Scot.), late Secretary, Royal Geographical Society. Twenty-two ordinary meetings were held, five in Edinburgh, six in Glasgow, five in Dundee, and six in Aberdeen. These meetings were addressed by Miss M. A. Czaplicka; Prof. James Young Simpson, M.A., D.Sc., F.R.S.E.; Dr. Vaughan Cornish, F.G.S., F.C.S., F.R.S.; Rev. Walter Weston; William George Black, LL.D.; Ralph Darlington, J.P.; Miss Ruth Raeburn.

Society's Medals.

The Livingstone Gold Medal was conferred on the Right Hon. Earl Kitchener of Khartoum, K.G., in recognition of his topographical work in connection with the survey of Palestine, and as Director of the Survey of Cyprus, as well as of his services to the State.

The Society's Gold Medal was awarded to Dr. J. Scott Keltie, F.R.G.S., F.S.S., F.S.A. (Scot.), late Secretary, Royal Geographical Society, in recognition of his great services to geography, especially during his thirty years' tenure of office in the Royal Geographical Society, first as Librarian and afterwards as Secretary.

The Silver Medal offered in connection with the Lectureship in Geography at Edinburgh University will, in future, be awarded to the first in the merit list. This year, however, the medal was not awarded on account of the fact that so many members of the class left at or before the end of the second term to join H.M. Forces.

Presentation of Livingstone Gold Medal.

The late Lord Kitchener having been unable in consequence of his onerous duties to come to Edinburgh to receive the medal in the ordinary way, the medal was presented to him at the War Office on the 29th of December 1915, by His Grace the Duke of Buccleuch and Dr. F. G. Ogilvie, C.B., as representing the Society.

The following address was read by the Duke of Buccleuch in making the presentation:—

"As representing the Council of the Royal Scottish Geographical Society, we have the honour to present the Livingstone Gold Medal, which was awarded to your Lordship on 5th July 1915.

"This award was made by the Council not only to signify their keen appreciation of your topographical work in connection with the Survey of Palestine and as Director of the Survey of Cyprus, but also in recognition of the signal services you have rendered to the Empire in the promotion of geographical investigation in other spheres where you have exercised authority.

"We may refer more particularly to the geographical aspects of your work in the great territory comprising Egypt and the whole basin of the Nile. The scientific services which you directed formed the basis for a policy of development and government, with the beneficent results of which all are familiar. These results could not have been obtained without absolute familiarity both with the geographical conditions and the habits and attitude of mind of the inhabitants.

"Presenting the medal in this office, we cannot but refer to the influence which your own work and your encouragement has had in emphasising the importance of geography in military matters. Your military work in South Africa and in India, as well as in the basin of the Nile, bristles with illustrations of the value which a soldier may obtain from sound geographical knowledge.

"While regretting that circumstances have prevented your Lordship from coming to Edinburgh to receive this medal in the place where it is usually presented, we express the hope that your Lordship may retain the health and strength necessary to enable you to continue your splendid work for the State, and especially to bring this war, which is of such importance to the civilisation of the world, to a successful conclusion."

There is a melancholy satisfaction in recording that the late Lord Kitchener on the occasion of the presentation being made, while intimating his great regret that his duties had prevented him from coming to Edinburgh up to that time, added an expression of his hope that on some future occasion, after the war was over, he might be able to pay such a visit and return his thanks for the medal in person. That that hope cannot now be fulfilled is an infinitesimal matter in view of the great calamity that has befallen the country through the death of his Lordship in the discharge of his duty.

Co-operation of the Society in the Training of Officers in His Majesty's Service.

According to the instructions of the Council intimation was made to the supreme commanders of H.M. Naval and Military forces in Scotland that the Society's rooms were open during the ordinary hours to all the officers of both services for the consultation of the maps and other materials in the possession of the Society. Several hundred officers have taken advantage of this offer.

Association of Scottish Teachers of Geography.

Owing to the war the Association of Scottish Teachers of Geography has again, as last year, been obliged almost wholly to suspend its activities. Its annual meeting was held on Friday, November 19, 1915, when a lecture was delivered by the Chairman of the Association on "Geography and the Course of the War," but there were no other meetings. The lecture then delivered was published in the Society's *Magazine* in January 1916.

The Scottish Geographical Magazine.

The Society's *Magazine* has, as usual, been published throughout the past session monthly, with maps and illustrations.

The Council are glad to acknowledge their obligations to the contributors of articles, and to the following gentlemen who have rendered valuable assistance to the editors:—Rev. A. C. Baird; Dr. J. G. Bartholomew; Mr. J. Hamilton Birrell, M.A.; Dr. R. N. Rudmose Brown; Mr. H. M. Cadell; Dr. R. Campbell; Mr. C. G. Cash, F.R.S.G.S.; Mr. George G. Chisholm; Mr. James Cossar, M.A.; Dr. J. D. Falconer; Mr. A. Patterson Gray, M.A.; Prof. J. W. Gregory; Sir Philip Hamilton Grierson; Mr. J. Harrison; Mr. Lionel Hinxman, B.A.; Rev. R. Mackenzie; Dr. W. L. Mackenzie; Mr. J. Mathieson; Mr. J. D. Monro; Rev. J. Morrison; Mr. T. S. Muir, M.A.; Mr. J. Murray; Mr. Ralph Richardson, W.S.; Mr. W. B. Wilson, W.S.; Lieut.-Col. A. C. Yate.

Members of the Society may have observed that the size of the *Magazine* has

been reduced by eight pages monthly. This reduction has been necessitated by the need for economy arising from the greatly increased cost of paper as well as the loss of income incurred by the Society through the numerous resignations in consequence of the war; but it is hoped that this reduction in the size of the *Magazine* will be of brief duration, for the Council trust that one result of the war will be greatly to increase the interest in geography and thus enable the Society, when the war is over, to secure a larger membership than it has ever yet had.

The Council desire to take this opportunity to express their thanks to imperial officials and others from whom they get frequent spontaneous acknowledgments of the good service rendered by the Society, chiefly through its *Magazine*.

The Library and Map Department.

During the past session 173 books, 64 pamphlets, 294 reports, 14 atlases, 457 map-sheets and charts have been added to the library. The transactions and periodicals received regularly number 144. The number of volumes borrowed by members was 2726, and the library was, as usual, much consulted by non-members in search of geographical information.

The Council desire to record their thanks to foreign and colonial governments for the official publications they have presented to the library; to the Treasury, for the revised Ordnance Survey maps of Scotland, both in outline and colour, as each of the revisions now in progress is published; to the Geological Survey of Scotland; to the Geographical Section, General Staff, War Office; to the Admiralty; to the British Museum (Natural History); to the Edinburgh University Library; to the Survey of India; and also to the undermentioned private donors of books and maps, viz.:—Mr. Edwin S. Balch; Dr. J. G. Bartholomew; Dr. George F. Black, New York; Dr. W. S. Bruce; Dr. J. Charcot; Dr. W. K. Dickson; Prof. L. W. Lyde; Sir Richard Mackie; Dr. F. Nansen; Dr. Marion Newbigin; Dr. J. Holland Rose; Mr. J. B. Tyrrell.

Glasgow, Dundee, and Aberdeen Centres.

The Council have again pleasure in acknowledging the services rendered by the honorary officials of the Glasgow, Dundee, and Aberdeen centres for their continued successful conduct of the business of the Society.

Obituary.

The Council regret to have to record the death during the last session of three of their members, Captain Livingstone Bruce, Mr. A. L. Cross, and Col. Harry Walker; also of Mr. J. A. Harvie Brown and Mr. J. B. Sutherland, past members of Council; Sir Charles Cayzer, Col. John Matheson, Sir Michael Nairn, and Sir A. R. Simpson, all original members of the Society; and among those who have died on military service, Captain Arthur Dickson (killed in action) and Dr. F. W. Moir (Persia).

Finance.

The Annual Financial Statement here follow .

ABSTRACT OF THE ACCOUNTS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

From 1st October 1915 to 30th September 1916.

FUNDS AT THE CLOSE OF LAST ACCOUNT:—			
£1000 Glasgow and South-Western Railway Company 4 per cent. Debenture Stock, at cost price, as at 29th May 1885,		£1102 19	9
£533, 6s. 8d. North British Railway Company 3 per cent. Consolidated Lien Stock, at cost price, as at 30th December 1890,		496 2	0
£200 Great Central Railway Company 4½ per cent. Debenture Stock, at cost price, as at 31st December 1898,		312 2	9
£240 North British Railway Company 4 per cent. Consolidated Preference Stock, No. 1, at cost price, as at 11th December 1902,		306 8	9
£400 Dominion of Canada 3½ per cent. Registered Stock, 1930-50, at cost price, as at 9th March 1911,		405 1	0
£400 War Loan 1925-45, purchased 19th July 1915, cost,		397 17	3
		£3020 11	6
BALANCE due by Banks:—			
On Account Current,	£136 13 1		
On Deposit Receipt,	228 16 6		
On Do. do. (Glasgow Equipment Fund)	64 16 9		
Due by Treasurer,	1 3 0		
	431 9 7		
	£3452 1 1		
Less—Subscriptions received in advance:—			
Ordinary Members,	£8 8 0		
Entrance Fees,	0 10 6		
	8 18 6		
	£3443 2 7		
SUBSCRIPTIONS from Ordinary Members,	£1378 13 0		
Less—Paid in Advance,	6 6 0		
	£1372 7 0		
SUBSCRIPTIONS from Life Members,	4 0 0		
SUBSCRIPTIONS from Associate Members,	84 0 0		
DIVIDENDS and INTERESTS,	104 1 1		
GOVERNMENT GRANT,	200 0 0		
MISCELLANEOUS,	13 11 6		
ENTRANCE FEES from new Members, £5 5 0			
Less—Paid in Advance, 0 10 6			
	4 14 6		
	1782 11 1		
	£5225 16 11		

MAGAZINE—Expenses of Publication, etc., for Nos. 10 to 12 of Vol. XXXI., and Nos. 1 to 9 of Vol. XXXII.:—			
Printing and other charges,		£556 16	3
Illustrations,		51 4	6
Maps,		11 17	0
		£619 17	9
Less—Magazines sold, £53 17 11			
Advertising Receipts, less Payments, 55 0 3			
	108 18	2	
	£510 19	7	
GENERAL PRINTING,		13 12	1
BOOKS and other furnishings for Library,		33 0	8
EXPENSES in connection with Lectures—*Less* Lecture Tickets sold,		285 18	10
GLASGOW BRANCH, Rent of Room,		15 0	0
RENT OF COUNCIL ROOM, Taxes, Gas, Repairs, Insurance, etc.,		254 7	11
SALARIES,		540 0	0
MISCELLANEOUS, including Stationery, General Expenses, and Postages,		72 13	7
MEDALS,		12 17	6
	£1738 10	2	
FUNDS AT THE CLOSE OF THIS ACCOUNT:—			
£1000 Glasgow and South-Western Railway Company 4 per cent. Debenture Stock, at cost price, as at 29th May 1885,	£1102 19 9		
£533, 6s. 8d. North British Railway Company 3 per cent. Consolidated Lien Stock, at cost price, as at 30th December 1890,	496 2 0		
£200 Great Central Railway Co. 4½ per cent. Debenture Stock, at cost price, as at 31st December 1898,	312 2 9		
£240 North British Railway Company 4 per cent. Consolidated Preference Stock, No. 1, at cost price, as at 11th December 1902,	306 8 9		
£400 Dominion of Canada 3½ per cent. Registered Stock, 1930-50, at cost price, as at 9th March 1911,	405 1 0		
£400 War Loan, 1925-45, purchased 19th July 1915, cost	397 17 3		
	£3020 11 6		
BALANCE due by Banks:—			
On Account Current,	£77 18 3		
On Deposit Receipt,	328 16 6		
On do. do. (Glasg. Equipment Fund),	64 16 9		
DUE by Treasurer,	2 0 3		
	473 11 9		
	£3494 3 3		
Less—Subscriptions received in advance:—			
Ordinary Members, £6 6 0			
Entrance Fees, 0 10 6			
	6 16 6		
	3487 6 9		
	£5225 16 11		

Edinburgh, 11th October 1916.—I have examined the Accounts of the Royal Scottish Geographical Society for the year ended 30th September 1916, of which the above is an Abstract, and compared them with the Vouchers and Books relating thereto, and find the same correctly stated.

JOHN MACKAY, C.A.

LIVINGSTONE MEDAL FUND.

FUNDS AT THE CLOSE OF LAST ACCOUNT:—

£770 North British Railway Company 4 per cent. Preference Stock, No. 1, at cost price,	£999 11 6	
Deposit Receipts,	98 12 4	
		£1098 3 10

INCOME RECEIVED:—

Dividend on £770 North British Railway Company 4 per cent. Preference Stock, No. 1, for year to 30th June 1916,	£25 5 2	
Bank Interest,	2 10 3	
Income-tax recovered,	4 1 10	
		31 17 3
		£1130 1 1

Paid Messrs. Alexr. Kirkwood and Son for Medal,	£30 0 0

FUNDS AT THE CLOSE OF THIS ACCOUNT:—

£770 North British Railway Company 4 per cent. Preference Stock, No. 1, at cost price,	£999 11 6	
Deposit Receipt,	100 9 7	
		£1100 1 1
		£1130 1 1

Edinburgh, 11th October 1916.—Examined and found correct.

P. C. ROBERTSON, M.A., C.A., Auditor.

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